OCT 25 1978
P-A STACKS

SEPTEMBER 1978 Number 409 - Part I

Solar-Geophysical Data prompt reports

Data for August 1978 -- July 1978

Explanation of Data Reports Issued as Number 402 (Supplement) February 1978

*COSMIC RAY DATA ERRATA PAGE 134

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Solar - Geophysical Data

NO. 409 SEPTEMBER 1978

Part I (Prompt Reports)

DATA FOR
AUGUST 1978
JULY 1978

NATIONAL GEOPHYSICAL AND SOLAR - TERRESTRIAL DATA CENTER
BOULDER, COLORADO

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SOLAR-GEOPHYSICAL DATA

No. 409

Issued in two parts

Helen E. Coffey, Editor

J. Virginia Lincoln, Chief
Solar-Terrestrial Physics Division

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C.4e	Solar Radio Spectral Obs. (Weissenau)	398A107	399A102	400A101	401A102	402A108	403A132	404A122	405A138	406A144	407A139	408A138	409A115	
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C.4h	Solar Radio Spectral Obs. (Owingeloo)	398A107	399A102	400A101	401A102	402A108	403A132	404A122	405A138	----	----	----	----	
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C.5e	Solar X-ray (SMS/GOES)	397A 22	399B 37	399A 22	400A 19	401A 24	402A 26	403A 29	404A 26	----	406A 32	407A 29	408A 33	409A 27
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F.1b	Cosmic Ray Neutron Counts (Climax)	398A116	399A115	400A112	401A108	406B 73	406B 73	406B 73	406B 73	406A161				
F.1e	Cosmic Ray Neutron Counts (Alert)	398A116	399A115	400A112	402B 47	402A124	403A138	404A138	405A150	407B 70	407A155	408A155		
F.1f	Cosmic Ray Neutron Counts (Calgary)	400B 70	400B 70	402B 47										
F.1g	Cosmic Ray Neutron Counts (Sulphur Mountain)	400B 70	----	402B 47										
F.1h	Cosmic Ray Neutron Counts (Thule)													
F.1i	Cosmic Ray Neutron Counts (Kiel)	398A116	399A115	400A112	401A108	402A124	403A138	404A138	405A150	406A161	407A155	408A155	409A134	
F.1j	Cosmic Ray Neutron Counts (Tokyo)	398A116	399A115	400A112	401A108	402A124	403A138	404A138	405A150	406A161	407A155	408A155	409A134	
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Notes:

"398A 36" listed under 1977 Aug means that data for August 1977 were contained in *Solar-Geophysical Data* Number 398 - Part I, beginning on page 36.

A = Part I, B = Part II.

----- = no data available.
blank = data not yet received.

AUGUST 1978 DATA

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ALERT PERIODS

INTERNATIONAL URSIGRAM
AND WORLD DAYS SERVICE
AUGUST 1978

PRESTO MESSAGES (THE RAPID REPORT OF MAJOR EVENTS).

28 AUGUST 1978, BOULDER 28/1300Z STRONG MAGSTORM IN PROGRESS 28/1300Z.
30 AUGUST 1978, BOULDER 30/1745Z TENFLARE 170 FLUX UNITS 30/1630Z 43 MINUTES DURATION. NOTE: NO OPTICAL, NO RISE IN X-RAY LEVEL.

SUMMARY OF THE GEOALERT WWA MESSAGES

Message serial number	Date of issue	Date of observation	Wolf number	10 cm solar flux	A index	Active Regions				Outstanding events	Forecasts			Alert Situations
						Location	No. of Flares				Date	Location	Desc*	
						Lat-Long	Total	M	X			Lat-Long		
213	1	31	047	106	02	N37E27	0	0	0		31	N37E27	Q	SOLQUIET MAGQUIET
						N21E27	0	0	0			N21E27	Q	
						S22E35	0	0	0			S22E35	Q	
214	2	1	062	103	07	N36E15	1	0	0		1	N36E15	Q	SOLQUIET MAGQUIET
						N20E14	0	0	0			N20E14	Q	
						S22E20	0	0	0			S22E20	Q	
						N25W23	0	0	0			N25W23	Q	
215	3	2	055	103	02	N35E04	0	0	0		2	N35E04	Q	SOLQUIET MAGALERT MINOR 04/XX
						N19E00	0	0	0			N19E00	Q	
						S22E07	0	0	0			S22E07	Q	
						N25W34	0	0	0			N25W34	Q	
						S26W64	0	0	0			S26W64	Q	
216	4	3	059	106	10	N37W12	0	0	0		3	N37W12	Q	SOLQUIET MAGNIL
						N19W13	0	0	0			N19W13	Q	
						S23W07	0	0	0			S23W07	Q	
						N27W47	0	0	0			N27W47	Q	
217	5	4	118	109	24	N36W22	0	0	0		4	N36W22	C,A	SOLQUIET MAGQUIET
						N18W25	0	0	0			N18W25	Q	
						S22W18	2	0	0			S22W18	C,A	
						N25W59	0	0	0			N25W59	Q	
						S17E43	0	0	0			S17E43	D,E	
						S22E59	0	0	0			S22E59	Q	
						S26E74	0	0	0			S26E74	Q	
						N18E82	0	0	0			N18E82	D,E	
						S31E41	0	0	0			S31E41	Q	
218	6	5	123	114	22	N35W34	0	0	0		5	N35W34	Q	SOLQUIET MAGQUIET
						N18W38	0	0	0			N18W38	Q	
						S22W32	2	0	0			S22W32	E	
						N25W73	0	0	0			N25W73	Q	
						S18E28	0	0	0			S18E28	Q	
						S20E44	0	0	0			S20E44	Q	
						S26E59	0	0	0			S26E59	E	
						N18E69	0	0	0			N18E69	C,E	
						S31E27	0	0	0			S31E27	Q	
219	7	6	134	119	14	N18W53	0	0	0		6	N18W53	Q	SOLQUIET MAGQUIET
						S23W48	1	0	0			S23W48	E	
						S18E16	0	0	0			S18E16	Q	
						S27E47	0	0	0			S27E47	E	
						N18E55	0	0	0			N18E55	C,E	
						N25W38	0	0	0			N25W38	Q	
						N16E39	0	0	0			N16E39	Q	
220	8	7	097	125	06	S23W60	0	0	0		7	S23W60	Q	SOLQUIET MAGQUIET
						S27E36	6	0	0			S27E36	E	
						N17E45	0	0	0			N17E45	Q	
						N17E32	0	0	0			N17E32	Q	
221	9	8	138	127	07	S22W74	0	0	0		8	S22W74	Q	SOLQUIET MAGQUIET
						S26E21	2	0	0			S26E21	C,E	
						N17E32	1	0	0			N17E32	Q	
						N16E18	0	0	0			N16E18	Q	
						N23W21	0	0	0			N23W21	Q	
						N23E29	0	0	0			N23E29	Q	
						N21E31	0	0	0			N21E31	Q	
222	10	9	100	128	06	S22W87	0	0	0		9	S22W87	Q	SOLQUIET MAGQUIET
						S26E09	1	0	0			S26E09	C,E	
						N16E24	0	0	0			N16E24	Q	
						N15E05	1	0	0			N15E05	Q	
						N21E17	0	0	0			N21E17	Q	
223	11	10	101	125	09	S26W04	3	0	0		10	S26W04	Q	SOLQUIET MAGQUIET
						N16E11	0	0	0			N16E11	Q	
						N15W07	5	0	0			N15W07	C,E	
224	12	11	089	119	10	S29W16	2	0	0		11	S29W16	Q	SOLQUIET MAGQUIET
						N16W01	0	0	0			N16W01	Q	
						N15W22	2	0	0			N15W22	Q	
225	13	12	126	121	21	S28W30	1	0	0		12	S28W30	Q	SOLQUIET MAGQUIET
						N17W15	0	0	0			N17W15	Q	
						N16W35	0	0	0			N16W35	Q	
						S33W44	2	0	0			S33W44	Q	
						N14E09	0	0	0			N14E09	Q	
						N10E26	0	0	0			N10E26	Q	
						S22W62	2	0	0			S22W62	Q	
226	14	13	166	132	12	S27W43	5	0	0		13	S27W43	E	SOLQUIET MAGQUIET
						N17W28	0	0	0			N17W28	Q	
						N16W46	0	0	0			N16W46	Q	
						S33W57	0	0	0			S33W57	Q	
						N14W03	0	0	0			N14W03	Q	
						S22W75	8	0	0			S22W75	E	
						N22W62	0	0	0			N22W62	Q	
						N45E58	0	0	0			N45E58	Q	
						N38E78	0	0	0			N38E78	Q	

ALERT PERIODS

INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

AUGUST 1978

SUMMARY OF THE GEOALERT WWA MESSAGES

Message serial number	Date of issue	Date of observation	Wolf number	I0 cm solar flux	A index	Active Regions: Location Lat-Long	No. of Flares: Total	M	X	Outstanding events	Forecasts: Date	Location Lat-Long	Desc*	Alert Situations
227	15	14	134	130	07	S27W56	5	0	0		14	S27W56	E	SOLQUIET MAGQUIET
						N17W39	0	0	0			N17W39	Q	
						N16W59	0	0	0			N16W59	Q	
						N25W47	0	0	0			N25W47	Q	
						S32W69	3	0	0			S32W69	E	
						S22W85	0	0	0			S22W85	Q	
						N44E44	0	0	0			N44E44	Q	
						N38E66	0	0	0			N38E66	Q	
						N27W07	0	0	0			N27W07	Q	
228	16	15	111	129	08	S28W69	3	0	0		15	S28W69	E	SOLQUIET MAGQUIET
						N46E27	2	0	0			N46E27	E	
						N39E52	1	0	0			N39E52	Q	
						N24W23	0	0	0			N24W23	Q	
						S21E70	0	0	0			S21E70	Q	
						N09W42	0	0	0			N09W42	Q	
229	17	16	075	121	05	S28W80	3	1	0		16	S28W80	E	SOLQUIET MAGQUIET
						N45E16	4	0	0			N45E16	E	
						N38E39	0	0	0			N38E39	Q	
						N25W35	0	0	0			N25W35	Q	
						S19E58	0	0	0			S19E58	Q	
230	18	17	056	118	05	N44W00	2	0	0		17	N44W00	E	SOLQUIET MAGQUIET
						N22W43	1	0	0			N22W43	C,E	
						S18E42	2	0	0			S18E42	E	
231	19	18	051	113	11	N45W14	0	0	0		18	N45W14	Q	SOLQUIET MAGQUIET
						N21W58	0	0	0			N21W58	E	
						S19E33	6	0	0			S19E33	E	
232	20	19	055	109	10	N44W29	0	0	0		19	N44W29	Q	SOLQUIET MAGQUIET
						N20W72	0	0	0			N20W72	C,E	
						S18E18	1	0	0			S18E18	E	
						S31W38	0	0	0			S31W38	Q	
233	21	20	079	105	03	N44W39	0	0	0		20	N44W39	Q	SOLQUIET MAGQUIET
						N21W84	2	0	0			N21W84	Q	
						S18E02	0	0	0			S18E02	Q	
						S27W08	0	0	0			S27W08	Q	
						S14E37	0	0	0			S14E37	Q	
						S24E48	0	0	0			S24E48	Q	
234	22	21	089	102	04	N43W54	0	0	0		21	N43W54	Q	SOLQUIET MAGQUIET
						S18W09	2	0	0			S18W09	Q	
						S23E33	0	0	0			S23E33	Q	
						S24E62	0	0	0			S24E62	Q	
235	23	22	053	104	06	S19W22	2	0	0		22	S19W22	Q	SOLQUIET MAGQUIET
						S24E24	0	0	0			S24E24	Q	
						S24E46	0	0	0			S24E46	Q	
						N20W13	1	0	0			N20W13	Q	
236	24	23	058	102	05	S20W32	4	0	0		23	S20W32	E	SOLQUIET MAGQUIET
						S23E36	0	0	0			S23E36	Q	
						N20W25	0	0	0			N20W25	Q	
						S16E47	0	0	0			S16E47	Q	
237	25	24	080	103	04	S18W49	0	0	0		24	S18W49	Q	SOLQUIET MAGQUIET
						S22W06	0	0	0			S22W06	Q	
						S23E19	0	0	0			S23E19	Q	
						N21W35	0	0	0			N21W35	Q	
						S17E31	3	0	0			S17E31	E	
238	26	25	105	102	06	S19W63	0	0	0		25	S19W63	Q	SOLQUIET MAGQUIET
						S24E07	0	0	0			S24E07	Q	
						N21W49	0	0	0			N21W49	Q	
						S17E19	1	0	0			S17E19	E	
						N26W39	0	0	0			N26W39	Q	
						S23W02	0	0	0			S23W02	Q	
						N10E50	0	0	0			N10E50	Q	
239	27	26	104	099	02	S19W77	0	0	0		26	S19W77	Q	SOLQUIET MAGQUIET
						S24W05	0	0	0			S24W05	Q	
						N21W60	0	0	0			N21W60	Q	
						S17E07	0	0	0			S17E07	Q	
						S24E19	0	0	0			S24E19	Q	
						N10E29	0	0	0			N10E29	Q	
						N19E67	3	0	0			N19E67	E	
						N23E73	0	0	0			N23E73	Q	
240	28	27	117	109	22	N21W74	0	0	0	SUDDEN COMMENCEMENT	27	N21W74	Q	SOLQUIET MAGALERT 28
						S16W07	0	0	0	OBSERVED 27/0247Z		S16W07	Q	
						N11E15	1	0	0	FOLLOWED BY WEAK		N11E15	Q	
						N19E53	10	0	0	MAGSTORM		N19E53	C,A	
						N34E63	0	0	0			N34E63	Q	
						S20W44	1	0	0			S20W44	Q	
						N20W35	0	0	0			N20W35		

ALERT PERIODS

INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

AUGUST 1978

SUMMARY OF THE GEOALERT WWA MESSAGES

Message serial number	Date of issue	Date of obser-vation	Wolf number	10 cm solar flux	A index	Active Regions				Outstanding events	Forecasts			Alert Situations
						Location	No. of Flares				Date	Location	Desc*	
						Lat-Long	Total	M	X			Lat-Long		
241	29	28	078	107	75	S17W18	0	0	0	A MAJOR MAGNETIC	28	S17W18	Q	SOLQUIET MAGALERT MINOR 29/31
						N10E02	5	0	0	STORM REACHED PEAK		N10E02	E	
						N20E42	0	0	0	INTENSITY 0600-		N20E42	Q	
						S21W55	0	0	0	0900Z ON 28 AUGUST		S21W55	Q	
						S19E74	0	0	0	PRESTO BOULDER		S19E74	Q	
										STRONG MAGSTORM IN				
										PROGRESS 1300Z				
242	30	29	106	114	35	S22W63	1	0	0		29	S22W63	Q	SOLQUIET MAGALERT MINOR 30/02
						N10W11	0	0	0			N10W11	Q	
						N20E26	0	0	0			N20E26	Q	
						N12W62	1	0	0			N12W62	Q	
						S20E54	0	0	0			S20E54	Q	
						N15E74	8	0	0			N15E74	E	
						S30E75	2	0	0			S30E75	E	
243	31	30	108	121	25	N20E17	0	0	0	PRESTO BOULDER	30	N20E17	Q	SOLALERT MINOR 31/02 MAGALERT
						N33E25	1	0	0	30/1745Z TENFLARE		N33E25	Q	MINOR 31/02
						N10W76	0	0	0	170 FLUX UNITS		N10W76	Q	
						S21E44	0	0	0	30/1630Z 43 MINUTES		S21E44	Q	
						N17E61	11	1	0	(NOTE: NO OPTICAL,		N17E61	C,A	
						S30E67	9	0	0	NO RISE IN X-RAY		S30E67	C,A	
										LEVEL)				
244	01	31	187	137	31	N20W64	0	0	0		31	N20W64	Q	SOLALERT 01/XX MAGALERT MINOR 01/02
						N15W23	0	0	0			N15W23	Q	
						N20E04	3	0	0			N20E04	E	
						N32E12	0	0	0			N32E12	Q	
						S20E32	1	0	0			S20E32	Q	
						N17E47	5	0	0			N17E47	C,A	
						S30E54	5	0	0			S30E54	D,A	
						S19E75	0	0	0			S19E75	Q	

* Q=Quiet E=Eruptive A=Active P=Proton C=Caution D=Doubtful O.G.=Other Groups MF=Major Flare

RELATIVE SUNSPOT NUMBERS

ZURICH, R_z

	1977 FINAL				1978 PROVISIONAL							
DAY	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
1	22	43	44	28	84	128	93	78	77	119	46	42
2	29	37	40	28	88	120	83	68	85	93	61	48
3	29	47	25	31	102	131	95	71	91	74	47	38
4	25	47	22	47	102	138	103	75	76	60	34	62
5	28	48	25	58	73	137	76	94	74	51	54	74
6	26	55	27	58	69	129	67	92	73	29	57	66
7	25	57	34	55	42	121	90	88	70	39	84	58
8	18	52	27	45	36	89	99	105	56	45	105	62
9	30	47	31	58	36	94	85	126	59	36	108	64
10	40	38	25	75	15	96	92	111	57	29	115	67
11	45	28	26	71	18	95	85	109	63	57	127	58
12	51	33	27	62	26	92	78	107	65	62	111	71
13	48	53	28	44	26	93	65	93	72	56	114	85
14	47	48	31	37	36	82	62	75	72	62	109	93
15	53	54	39	41	30	59	72	61	78	89	102	72
16	56	53	49	39	23	64	70	85	91	97	110	42
17	53	51	51	29	24	56	66	99	79	103	98	49
18	60	50	54	33	14	55	72	100	85	115	78	53
19	59	54	52	40	8	53	64	107	84	109	74	42
20	60	54	38	23	7	52	51	115	74	109	76	28
21	58	42	32	23	28	63	77	112	73	154	77	26
22	42	35	28	17	30	74	82	109	73	158	48	36
23	41	30	24	23	43	69	85	105	72	158	33	45
24	48	29	18	31	37	78	82	102	82	154	38	45
25	46	28	18	35	32	94	78	139	86	135	30	54
26	49	30	9	41	47	86	53	115	84	152	13	37
27	54	38	14	50	69	79	50	98	97	134	21	55
28	61	37	9	45	79	88	49	75	90	130	31	58
29	64	42	10	58	90		48	72	103	115	48	59
30	60	45	23	64	104		44	70	107	99	35	70
31		52		67	118		70		109		36	100
MEAN	44.0	43.8	29.1	43.2	49.3	89.8	73.5	94.7	79.3	94.1	68.4	56.7

1977 yearly mean = 27.5

DAILY SOLAR FLUX AT 2800 MHz
OTTAWA ARO

FLUX ADJUSTED TO 1 A.U., S_a

	1977				1978							
DAY	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
1	83.1	93.8*	94.4	88.4	126.9*	139.1	136.3	130.8	181.4	149.1	142.9	106.0
2	84.2	93.2	93.6	91.2	133.9	152.6	141.1	129.8	183.0	147.0*	127.6	106.0
3	87.2	97.4	90.4	93.7	130.2	156.6*	146.6	134.5	182.2A	130.8	116.5	109.6
4	84.2	98.8	89.4	95.9	124.8	154.8	148.4	143.3*	178.4	118.6	117.4	112.3
5	85.6	104.0*	90.6	96.9	119.2	159.0	154.5	146.7*	173.9*	116.9	116.9	117.6
6	84.9	103.5	91.1	102.0*	118.7*	156.1	162.8	145.3*	173.1	109.8	119.3*	122.6
7	89.3	105.5	90.2	105.5	111.6	157.3	165.2	146.9	162.6*	110.6	128.9	128.2
8	91.6	103.8	90.3	106.7	102.8	157.0*	168.7	148.6	143.4	109.3	135.9	130.6
9	95.9	100.7	91.1	112.6*	97.0	155.2	163.7	156.1	135.1	106.5	147.1*	128.1*
10	99.8	96.4	93.1	114.7	93.5	148.7	179.1	155.4	129.5	108.4	156.0*	127.5
11	104.6	95.3	94.9	107.4	93.1	154.2	175.2	162.8*	133.8	113.2	163.2*	121.7
12	107.8	100.8	91.4	111.0	92.1	159.0	169.8	156.2	138.2	116.4*	174.2*	124.5
13	112.9	98.5	94.8	100.6	90.3	151.2	160.9	145.6	140.2	120.3*	165.5	134.9
14	118.2	98.9	97.9	93.7*	88.6	148.4	160.5	139.1	143.7	126.4*	163.1	132.7
15	120.7	98.2	97.9	92.5	89.6	136.8	154.2	141.4	146.1	132.5	169.5	130.8*
16	120.4	96.8	95.9	92.5	86.4	130.2	143.3	137.6	147.8*	139.5*	163.4	123.6
17	120.6	94.9	100.4	91.1	83.8	125.9	135.4	133.4	143.8	149.0	159.5	119.3*
18	120.5	95.4	102.0*	93.6	84.7	124.9	132.3	134.1	135.6	153.5*	154.1*	115.6
19	104.5	105.8	99.2	91.0	85.4	119.1	128.1	139.5*	133.6	162.0*	148.6	111.6
20	100.8	99.6*	95.7*	88.7	87.0	122.2	125.3	138.1	132.3*	174.2	142.9*	107.5
21	104.9*	98.6*	92.8	87.8	91.4	122.2	118.2	138.4*	132.7	185.4*	140.2	104.8
22	102.4	93.9	89.3	89.9	96.9	127.7	117.0	146.4	135.7*	190.3	127.0	106.0
23	99.3	87.3	88.0	91.2	99.6	131.8	116.4	162.9	142.9*	196.7	123.4*	104.1
24	100.6	88.3	86.7	93.9	100.4	135.6	117.5	159.8	146.5*	194.8	116.5	105.4
25	98.8	88.1	84.7	96.3	103.3	139.3	118.2	159.1*	147.6	183.5	113.7	104.2
26	99.4	88.6	84.1	99.3	112.7	134.8	112.5	166.7	152.8	182.4*	112.2	100.7
27	100.0	88.5	83.8	98.3	116.4	137.5	114.1	172.8	150.6*	179.5	110.8	107.3*
28	100.0	90.3*	85.6	98.9	127.7*	135.4	112.7	176.6*	147.1*	174.1	109.9	107.7*
29	99.4	90.3	85.6	105.6*	132.2*		111.1	185.2	148.6	167.4	109.2	116.2
30	97.7	94.9	85.3	114.7	134.9		115.4*	182.1*	147.2*	154.6*	109.2	124.1
31		95.9		120.2	133.3*		124.5		152.6		108.8	133.9*
MEAN	100.9	96.3	91.6	98.9	106.1	141.8	140.3	150.5	149.7	146.8	135.4	116.9

* adjusted for burst
A = interpolated data point

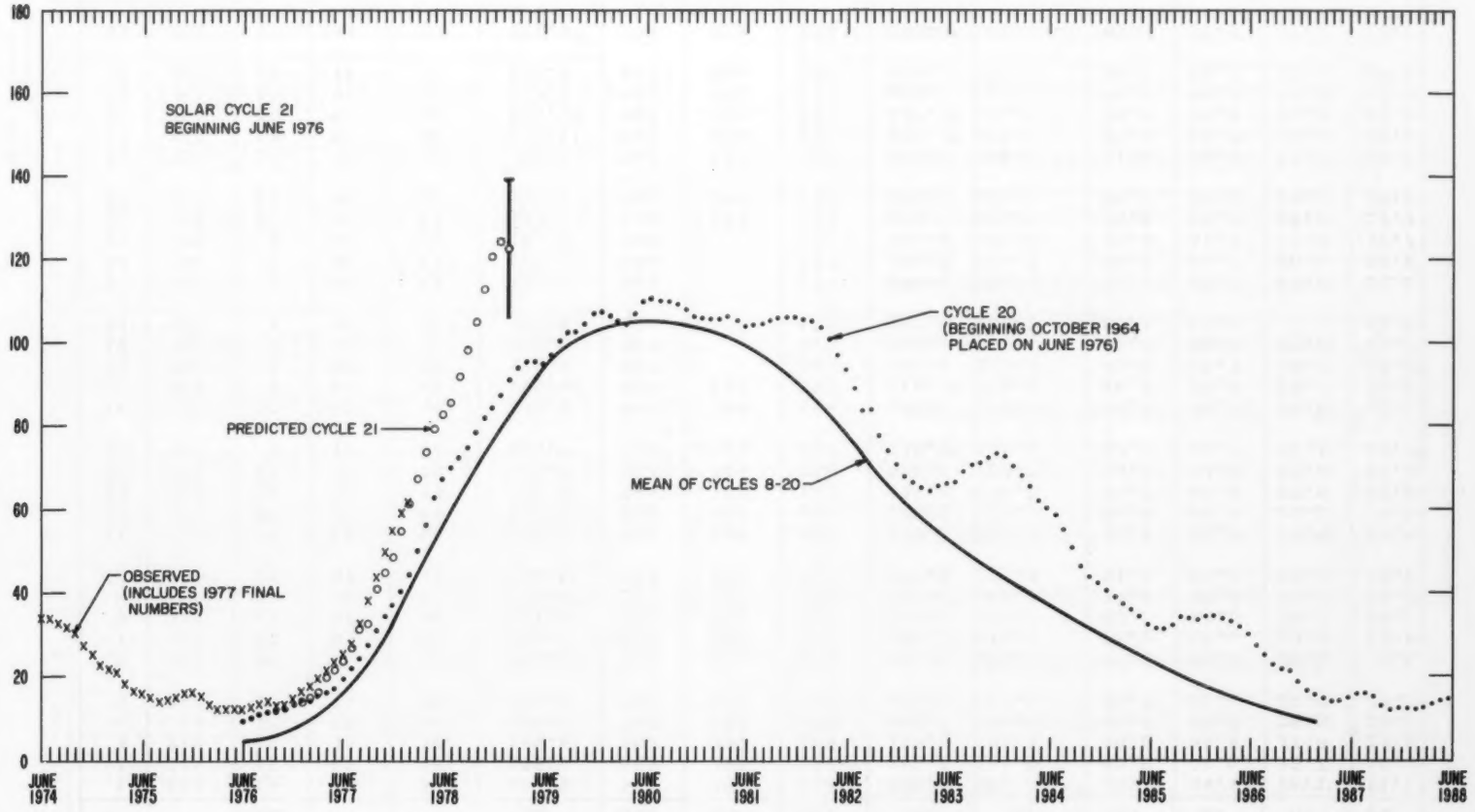
DAILY SOLAR INDICES

AUGUST 1978

AUG 1978	YEAR DAY	BARTELS 27-DAY CYCLE NUMBER	SUNSPOT NUMBERS		OBSERVED FLUX	SOLAR FLUX ADJUSTED TO 1 A.U.								
			R_Z	$R_{A'}$	OTTAWA 2800	AFGL 15400	AFGL 8800	AFGL 4995	OTTAWA 2800	AFGL 2695	AFGL 1415	AFGL 606	AFGL 410	AFGL 245
1	213	14	42	36	102.9	555	296	138	106.0	101.8	82.3	64.1	26.1	11.1
2	214	15	48	35	102.9	558	292	137	106.0	101.5	80.9	59.4	25.7	10.9
3	215	16	38	35	106.4	560	295	142	109.6	101.8	82.0	59.8	27.5	10.6
4	216	17	62	61	109.1	563	308	139	112.3	111.8	86.1	60.7	28.4	10.2
5	217	18	74	52	114.3	567	303	147	117.6	117.0	86.3	61.1	27.9	10.2
6	218	19	66	54	119.1	563	301	155	122.6	123.1	87.9	59.3	26.1	9.4
7	219	20	58	52	124.7	560	306	166	128.2	130.2	90.6	63.4	29.8	10.0
8	220	21	62	44	127.0	557	301	160	130.6	137.3	93.2	60.0	29.1	10.1
9	221	22	64	45	124.6*	567	311	165	128.1*	140.0	94.0	65.8	29.0	10.2
10	222	23	67	49	124.1	557	303	159	127.5	129.3	91.8	65.2	29.9	10.0
11	223	24	58	40	118.5	566	305	150	121.7	121.6	91.0	65.3	29.9	10.5
12	224	25	71	59	121.2	565	307	152	124.5	122.2	92.8	63.2	29.2	9.9
13	225	26	85	83	131.5	564	310	162	134.9	134.2	93.2	63.6	27.5	12.0
14	226	27	93	76	129.3	563	314	166	132.7	129.5	90.0	63.8	29.5	11.2
15	227	1	72	62	126.7*	572	319	167	130.0*	131.0	92.5	68.2	31.3	13.9
16	228	2	42	44	120.6	559	308	154	123.6	120.5	88.7	70.2	28.8	12.1
17	229	3	49	43	116.4*	556	297	153	119.3*	118.4	89.2	70.8	28.7	11.2
18	230	4	53	39	112.8	557		145	115.6	112.7	83.5	65.9	29.7	10.2
19	231	5	42	34	109.0	559		145	111.6	110.0	80.7	66.0	27.7	11.7
20	232	6	28	29	105.0	560		140	107.5	104.2	80.2	62.6		11.8
21	233	7	26	14	102.4	560		139	104.8	104.5	76.2	60.8	29.3	12.0
22	234	8	36	23	103.6	554		137	106.0	101.9	74.3	60.0	26.4	12.0
23	235	9	45	31	101.9	559		138	104.1	102.3	74.9	60.8	27.9	12.7
24	236	10	45	48	103.1	560	282	139	105.4	106.5	78.8	60.7	28.9	12.9
25	237	11	54	42	102.0	561	284	138	104.2	103.4	76.6	58.0	28.1	12.2
26	238	12	37	42	98.6	563	297	136	100.7	101.5	71.6	56.9	27.1	12.5
27	239	13	55	58	105.1*	565	304	145	107.3*	109.5	73.6	60.2	28.1	13.6
28	240	14	58	46	105.6*	565	303	149	107.7*	111.0	79.5	57.9	26.3	12.9
29	241	15	59	60	113.9	566	302	152	116.2	113.0	80.4	59.1	27.7	13.6
30	242	16	70	69	121.8	570	314	164	124.1	127.1	90.2	62.9	32.6	14.5
31	243	17	100	87	131.4*	575	328	185	133.9*	140.0	95.6	62.9	27.6	13.2
MEAN			56.7	48.1	114.0	562	304	150	116.9	116.7	84.8	62.5	28.4	11.6

* Adjusted for burst.

Note: Data gaps in AFGL Sagamore Hill are due to equipment problems.



OBSERVED AND PREDICTED SUNSPOT NUMBERS

SMOOTHED OBSERVED AND PREDICTED SUNSPOT NUMBERS
CYCLE 21

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1976	15.2	13.2	12.2	12.6	12.5	12.2	12.9	14.0	14.3	13.4	13.5	14.8
1977	16.7	18.1	20.0	22.2	24.2	26.3	28.8	33.0	38.5	44.6	50.5	55.4
1978	59.6	62.1	67.8	73.8	80.4	86.3	91.1	95.4	99.4	103.1	107.4	113.4
			(2)	(4)	(7)	(10)	(13)	(16)	(18)	(19)	(18)	(17)
1979	118.4	122.7	126.7	129.4	132.0	136.3	140.4	143.2	144.9	145.7	145.8	145.2
	(16)	(17)	(20)	(24)	(27)	(29)	(31)	(33)	(36)	(38)	(40)	(42)
1980	143.9	142.7	142.2	142.6	142.0	139.0	135.7	133.1	131.7	130.9	129.5	128.1
	(42)	(42)	(40)	(40)	(41)	(43)	(45)	(46)	(45)	(46)	(48)	(50)
1981	127.7	127.0	124.7	121.9	119.7	117.6	116.7	116.6	115.8	114.5	112.4	109.5
	(53)	(53)	(51)	(50)	(50)	(49)	(47)	(46)	(45)	(45)	(43)	(41)
1982	106.5	103.4	101.0	99.0	96.8	94.2	90.5	86.3	82.5	78.4	75.4	72.0
	(39)	(38)	(37)	(36)	(34)	(33)	(31)	(29)	(27)	(23)	(22)	(21)
1983	68.1	65.3	63.4	61.3	59.3	57.1	55.1	53.3	51.5	50.1	49.1	48.3
	(21)	(21)	(22)	(22)	(22)	(23)	(24)	(26)	(27)	(29)	(30)	(30)
1984	47.2	45.5	43.0	39.8	37.4	36.1	35.0	33.5	32.1	31.1	30.0	28.5
	(31)	(30)	(29)	(28)	(29)	(31)	(31)	(31)	(30)	(29)	(27)	(27)
1985	27.4	26.5	25.6	25.1	24.5	23.6	22.8	22.0	21.2	20.3	19.4	18.8
	(26)	(26)	(26)	(26)	(25)	(24)	(23)	(22)	(22)	(23)	(23)	(24)
1986	18.5	17.9	17.2	16.3	15.2	14.1	13.3	12.8	12.5	12.2	12.0	11.9
	(24)	(24)	(23)	(22)	(21)	(20)	(19)	(18)	(17)	(16)	(15)	(13)
1987	12.2	12.7	13.4	14.3	15.3							
	(11)	(11)	(11)	(11)	(12)							

The table gives observed Zürich smoothed sunspot numbers for Cycle 21 up to the one calculated from the latest observed data, marked by a vertical bar. They are based on final Zürich numbers through 1977 and provisional Zürich numbers thereafter. Some of these data after the June 1976 value will change slightly when final data for 1978 are received. The numbers after the vertical bar are predictions by the McNish-Lincoln method (see *Explanation of Data Reports*, February 1978). Shown in parentheses are the corresponding absolute values of the 90% confidence interval, an indication of the uncertainty above and below the predicted number.

The McNish-Lincoln method is very sensitive to the identification of a minimum epoch. In SGD 390-401 issues, the Cycle 21 predictions were based on March 1976 as the minimum epoch. Latest studies, including one published by Waldmeier, show that June 1976 is the more appropriate epoch of minimum. Thus, we have adopted a June 1976 mimimum.

*Prediction of Sunspot Maximum -- The McNish-Lincoln prediction method is recommended for predictions up to only one year ahead. From that point, the predictions regress rapidly towards the mean value. Combining this McNish-Lincoln prediction of sunspot maximum with the Ohl method (as done by Sargent, see *Explanation of Data Reports*, February 1978) indicates that the most probable value for sunspot maximum is 150 ± 35.

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS'			REMARKS
	DATE AUG	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
TEHR	04	1130E	1132U	1148	S21	E16	.365		5.7	180	SB	2	C		159		U H
PALE	04	1849	1857	1901	S21	W22	.437		3.1	12	SN	3	C		39		DE
ISTA	05	0620E		0645D	S25	E65	.904		10.1	25D	SN						K
ISTA	05	0755E		0759	S25	E65	.904		10.2	4D	SF						
RAMY	05	1251	1253	1304	S20	W27	.494		3.5	13	SN	3	C		48		FDE
RAMY	06	1251	1252	1259	S23	W38	.645		3.7	8	SB	3	C		60		F
RAMY	07	1126E	1126U	1135	S28	E39	.679		10.4	9D	SB	2	C		42		F
RAMY	07	1126E	1126U	1147	S22	E26	.493		9.4	21D	SN	2	C		28		F
RAMY	07	1629	1631	1633	S26	E38	.658		10.5	4	SN	3	C		25		F
HOLL	07	1736	1749	1758D	S26	E40	.680		10.7	22D	SF	3	C		50		FDE
PALE	07	1912	1912U	2005D	S26	E38	.658		10.7	53D	SN	3	C		20		DE
HOLL	07	2010	2018	2022	S26	E38	.658		10.7	12	SN	3	C		56		DE
PALE	07	2014		2046	S26	E37	.647		10.6	32	SN	2	C		0		DE
HOLL	07	2215	2218	2225	S26	E37	.647		10.7	10	SN	3	C		36		DE
HOLL	07	2311	2316	0003	S26	E36	.636		10.7	52	SB	3	C		93		F H
RAMY	08	1414	1415	1424	S26	E27	.535		10.6	10	SN	3	C		30		F
RAMY	08	1438	1438	1442	N20	E35	.687		11.2	4	SN	3	C		32		
RAMY	08	1444	1510	1519	S26	E26	.523		10.6	35	SN	3	C		35		F
ISTA	09	0655		0700	S29	E21	.499		10.9	5	SB			0658			
PALE	09	2329	2329	2342	N16	E 6	.396		10.4	13	SN	3	C		62		DE
HOLL	10	1541	1547	1611	S26	E 2	.334		10.8	30	SB	3	C		107		F
HOLL	10	1621	1641	1647	S26	E 1	.333		10.8	26	SN	3	C		48		
HOLL	10	1656	1656	1715	S26	E 1	.333		10.8	19	SN	3	C		29		
HOLL	10	1734	1735	1741	N16	W 4	.390		10.4	7	SN	3	C		34		
HOLL	10	1751	1751	1758	S26	E 1	.333		10.8	7	SN	3	C		26		
PALE	11	0038	0038	0042	N15	W 8	.391		10.4	4	SN	3	C		22		DE
PALE	11	0341	0345	0353	S26	W 7	.350		10.6	12	SB	3	C		44		DE
TEHR	11	0341E	0343	0356	S27	W 6	.361		10.7	15D	SB	2	C		127		DE
ISTA	11	0734		0755	N19	E42	.751		14.5	21	SF						D
ISTA	11	0800		0808	S24	W08	.325		10.7	8	SF						D
RAMY	11	1211	1213	1223	S26	W11	.375		10.7	12	SB	2	C		44		FDE
PALE	11	2025	2025	2030	N16	W19	.491		10.4	5	SB	3	C		42		DE
PALE	12	0002	0002	0010	S26	W18	.436		10.7	8	SN	3	C		20		DE
RAMY	12	1900	1915	1944	S23	W58	.848		8.4	44	SN	3	C		47		
PALE	12	1913	1918	1930	S20	W59	.854		8.4	17	SN	3	C		63		DE
RAMY	12	1925	1927	1934	S34	W41	.727		9.7	9	SN	3	C		16		
RAMY	12	1959	2000	2005	S23	W58	.848		8.5	6	SN	3	C		18		
PALE	13	0224E	0231U	0245D	S20	W63	.886		8.4	21D	SN	2	C		25		F
RAMY	13	1104E	1104U	1115	S23	W66	.909		8.5	11D	SB	3	C		35		F
RAMY	13	1109	1115	1120	N46	E59	.963		17.9	11	SF	3	C		29		F
TEHR	13	1220	1227	1250	S21	W65	.901		8.6	30	SB	2	C		111	00.0	
RAMY	13	1221	1223	1250	S22	W67	.915		8.5	29	SB	3	C		77		F
RAMY	13	1254	1255	1404	S25	W37	.640		10.8	70	SB	3	C		21		F
RAMY	13	1410	1412	1425	S27	W37	.650		10.8	15	SB	3	C		24		F
RAMY	13	1423	1424	1430	S22	W67	.915		8.6	7	SN	3	C		18		
RAMY	13	1443	1444	1450	S27	W37	.650		10.8	7	SB	3	C		23		F
RAMY	13	1526	1534	1546	S22	W68	.921		8.5	20	SB	3	C		31		
HOLL	13	1526	1534	1539	S24	W69	.928		8.5	13	SN	3	C		20		
RAMY	13	1616	1616	1624	S28	W37	.655		10.9	8	SN	3	C		16		
RAMY	13	1639	1655	1712	S23	W70	.934		8.4	33	SB	3	C		41		
HOLL	13	1653	1656	1703	S24	W70	.934		8.5	10	SN	3	C		18		
RAMY	13	1655	1655	1703	S28	W37	.655		10.9	8	SN	3	C		17		
RAMY	13	1755	1800	1817	S23	W70	.934		8.5	22	SB	3	C		67		
HOLL	13	1756	1759	1811	S24	W71	.939		8.4	15	SB	3	C		32		U F
PALE	13	1758	1800	1832	S20	W71	.939		8.4	34	SB	3	C		30		FDE
PALE	13	1759	1800	1803D	S20	W71	.939		8.4	4D	SB	3	C		30		FDE
RAMY	14	1152	1248	1308	N19	W80	.992		8.5	76	SN	3	C		12		
RAMY	14	1247	1250	1310	S34	W63	.898		9.8	23	SB	3	C		14		
RAMY	14	1320	1325	1348	S34	W63	.898		9.8	28	SN	3	C		14		
RAMY	14	1329	1329	1337	N19	W80	.992		8.6	8	SN	3	C		8		
PALE	14	1736	1738	1759	S27	W52	.801		10.8	23	SN	3	C		42		DE
PALE	14	2105	2106	2111	S27	W53	.810		10.9	6	SN	3	C		37		DE

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OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE AUG	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP DAY	MIN.		CORD.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
TEHR	15	0330E	0334	0336	N44	E44	.902		18.4	6D	SN	2	C		127		
TEHR	15	1020E	1023U	1037	S27	W65	.904		10.6	17D	SB	2	C		159		F
HOLL	15	1547	1550	1611	S29	W65	.905		10.8	24	SN	3	C		24		F
RAMY	15	1547	1548	1607	S28	W62	.884		11.0	20	SB	3	C		28		F
RAMY	15	1621	1623	1625	N44	E31	.848		18.0	4	SN	3	C		18		
RAMY	15	1827	1836	1854	N36	E58	.935		20.1	27	SB	3	C		54		FDE
HOLL	15	1830	1836	1855	N39	E57	.938		20.0	25	SN	3	C		55		F
PALE	15	2205	2214	2221	S35	W88	.995		9.3	16	SN	3	C		18		F
ISTA	16	0600E		0645	N45	E31	.856		18.6	45D	SN						K
TEHR	16	0621	0629	0639	N45	E27	.841		18.3	18	SN	2	C		127		U
ISTA	16	0640E		0710D	S33	W75	.960		10.7	30D	SN						
TEHR	16	0641E	0642U	0650	S27	W73	.950		10.8	9D	SB	2	C		63		
HOLL	16	1326	1337	1406	S28	W76	.963		10.9	40	SB	3	C		70		F
HOLL	16	1729	1732	1736	N45	E17	.810		18.0	7	SN	3	C		21		
PALE	16	2029	2030	2034	N44	E14	.793		17.9	5	SN	3	C		22		DE
PALE	17	0005	0006	0009	S15	E56	.823		21.2	4	SN	3	C		47		F
HOLL	17	0006E	0006U	0010D	S14	E57	.833		21.3	4D	SN	2	C		29		
PALE	17	0055E	0055U	0057D	N20	W33	.671		14.6	2D	SN	3	C		27		F
TEHR	17	0343	0345	0357	N45	E10	.795		17.9	14	SB	2	C		127		R
MANI	17	0343	0345	0359	N44	E10	.785		17.9	16	SN	3	C		80	1.0	
PALE	17	0345E	0345U	0405D	N44	E10	.785		17.9	20D	SB	3	C		143		F
PALE	17	1907	1907U	1911D	N44	E 3	.777		18.0	4D	SN	3	C		30		DE
HOLL	17	1907	1908	1913	N45	E 4	.788		18.1	6	SN	3	C		71		FDE
HOLL	17	1907	1911	1919	N39	E32	.816		20.2	12	SB	3	C		27		FDE
PALE	17	1943	1945	1954	S17	E47	.731		21.3	11	SN	3	C		35		DE
ISTA	18	0714		0730	S19	E41	.664		21.4	16	SN						K
BUCA	18	0715	0719	0733	S19	E38	.627		21.2	18	SN		C	0719	53	.8	D
TEHR	18	0717E	0719U	0731	S20	E39	.643		21.2	14D	SN	2	C		63		
ISTA	18	0740		0755	N30	E73	.982		23.8	15	SN						
RAMY	18	1119E	1123U	1137	S17	E35	.582		21.1	18D	SB	2	C		75		H
RAMY	18	1149	1157	1215	S17	E38	.622		21.3	26	SB	3	C		55		F
RAMY	18	1237	1242	1333	S17	E38	.622		21.4	56	SB	3	C		62		F
RAMY	18	1346	1352	1358	S16	E35	.580		21.2	12	SB	3	C		46		F H
RAMY	18	1419	1420	1434	S17	E35	.582		21.2	15	SB	3	C		38		F H
PALE	18	1929	1941	1954	S18	E34	.572		21.4	25	SN	3	C		46		DE
PALE	19	1852	1907	1914	S18	E21	.395		21.4	22	SN	3	C		47		DE
RAMY	20	1313	1313	1318	N20	W80	.993		14.6	5	SN	3	C		10		
RAMY	20	1647	1647	1650	N20	W81	.995		14.6	3	SN	3	C		9		
PALE	21	0239	0240	0243	S18	E 6	.215		21.6	4	SN	3	C		42		DE
RAMY	21	1450	1451	1459	S18	W 4	.202		21.3	9	SN	3	C		22		
HOLL	21	1728	1738	1757	S27	W18	.443		20.4	29	SN	3	C		63		F
HOLL	22	1349	1353	1356	N21	W 9	.491		21.9	7	SF	2	C		34		F
ISTA	23	0710		0747	S20	W21	.408		21.7	37	SN			0719			F
BUCA	23	0710		0729	S18	W24	.435		21.5	19	SF		C	0716	107	1.3	E
RAMY	23	1524	1532	1611	S19	W29	.509		21.5	47	SB	3	C		85		FDE
HOLL	23	1525	1533	1546	S18	W29	.504		21.5	21	SN	3	C		66		
HOLL	23	1555	1557	1606	S18	W29	.504		21.5	11	SN	3	C		33		
RAMY	23	1635	1635	1646	S21	W30	.532		21.4	11	SN	3	C		40		
RAMY	23	1746	1748	1756	S21	W30	.532		21.5	10	SN	3	C		74		FDE
TEHR	24	0311	0315	0347	N11	E68	.940		1.2	36	SF	2	C		31		
TEHR	24	0602	0604	0636	S16	E42	.669		27.4	34	SN	2	C		95		F H
RAMY	24	1823	1823	1843	S16	E36	.592		27.5	20	SN	3	C		18		
RAMY	24	1933	1933	1945	S16	E35	.579		27.4	12	SN	3	C		18		
RAMY	25	1154	1209	1230	S16	E26	.453		27.4	36	SB	3	C		109		FDE
MITK	25	2334E	2336	2407	S24	E10	.332		26.7	33D	SN		C	2336			E
HOLL	26	2110	2112	2121	N22	E71	.968		4.2	11	SN	3	C		59		U F
PALE	26	2111	2114	2125	N20	E71	.965		4.2	14	SN	2	C		48		F
HOLL	26	2152	2154	2219	N22	E70	.963		4.2	27	SN	3	C		59		U F
PALE	26	2155	2155	2206	N20	E71	.965		4.2	11	SN	3	C		23		F

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE AUG	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
PALE	27	0306	0313	0316	N20	E68	.952		4.2	10	SN	3	C		24		F
MITK	27	0724E	0729	0739	N19	E67	.945	15496	4.3	15D	1N		C	0729	180		
RAMY	27	1136	1205	1211	N20	E62	.919		4.1	35	SN	3	C		30		
RAMY	27	1214	1217	1319	N20	E62	.919		4.2	65	SB	3	C		109		
RAMY	27	1417	1418	1422	S22	W38	.636		24.7	5	SN	3	C		22		
HOLL	27	1545	1548	1551	N23	E61	.919		4.2	6	SB	3	C		32		FDE
HOLL	27	1559	1625	1657	N23	E60	.913		4.2	58	SB	3	C		128		F
RAMY	27	1631	1633	1659	N20	E59	.899		4.1	28	SB	3	C		38		
RAMY	27	1701	1709	1728	N20	E59	.899		4.1	27	SN	3	C		22		
HOLL	27	1701	1719	1730	N23	E60	.913		4.2	29	SN	3	C		48		F
HOLL	27	1841	1847	1910	N23	E59	.907		4.2	29	SB	3	C		45		
PALE	27	1845	1850	1900	N21	E58	.895		4.1	15	SB	3	C		22		F
HOLL	27	1940	1944	1951	N11	E21	.465		1.4	11	SB	3	C		132		
PALE	27	1941	1945	1959	N11	E18	.431		1.2	18	SB	3	C		145		F
HOLL	27	2036	2038	2054	N23	E58	.900		4.2	18	SB	3	C		113		
PALE	27	2037	2039	2055	N21	E57	.888		4.1	18	SB	3	C		89		F
HOLL	27	2308	2313	0003	N22	E69	.959		5.1	55	SF	3	C		45		U F
HOLL	27	2330	2334	2357	N23	E56	.887		4.2	27	SB	3	C		70		F
MITK	28	0208	0217	0232D	N10	E13	.367		1.1	24D	SB		C	0217			E
PALE	28	0208E	0217U	0235D	N11	E15	.399		1.2	27D	SN	3	C		87		U F
MITK	28	0343	0351	0409	N20	E56	.878		4.4	26	SF		C	0351			E
RAMY	28	1559	1607	1644	N10	E 6	.312		1.1	45	SB	4	C		54		FDE
HOLL	28	1605	1606	1613	N10	E 9	.332		1.3	8	SB	3	C		80		F
RAMY	28	1707	1707	1722	N10	E 5	.307		1.1	15	SB	4	C		35		
PALE	28	1708	1708	1718	N11	E 6	.328		1.2	10	SN	3	C		62		F
HOLL	29	0047	0048	0052	S25	W31	.567		26.7	5	SN	2	C		21		F
ISTA	29	0730		0900	N10	W53	.824		25.3	90	SF						B
WEND	29	0842		0936	N12	W55	.848		25.2	54	SF		V				D
RAMY	29	1241	1243	1251	N17	E78	.987		7.4	10	SF	3	C		0		
RAMY	29	1412	1414	1432	S30	E79	.974		7.5	20	SF	4	C		0		
RAMY	29	1532	1537	1546	N17	E77	.984		7.4	14	SN	4	C		0		
RAMY	29	1717	1717	1735	S25	W57	.840		25.4	18	SN	4	C		13		
RAMY	29	1803	1804	1811	N17	E75	.978		7.4	8	SB	4	C		19		FDE
RAMY	29	1913	1913	1925	N17	E75	.978		7.4	12	SF	4	C		9		FDE
RAMY	29	1933	1933	1941	N17	E74	.974		7.4	8	SF	4	C		10		FDE
RAMY	29	2025	2033	2047	N17	E74	.974		7.4	22	SN	3	C		17		FDE
TEHR	30	0534E	0537	0546	N15	E74	.973		7.8	12D	SN	2	C		95		
TEHR	30	0734E	0737	0746	N15	E74	.973		7.9	12D	SN	2	C		95		
ISTA	30	0759		0809	N19	E71	.964		7.7	10	SF						Z
RAMY	30	1137	1200	1249	N19	E65	.935		7.4	72	SB	4	C		33		FDE
RAMY	30	1145	1157	1217	S27	E70	.933		7.7	32	SB	3	C		37		FDE
RAMY	30	1148	1148	1204	N35	E33	.793		5.0	16	SN	3	C		19		
RAMY	30	1309	1309	1324	S25	W67	.915		25.5	15	SN	4	C		14		
RAMY	30	1338	1340	1344	N19	E65	.935		7.4	6	SB	4	C		44		
RAMY	30	1418	1419	1440	N19	E64	.929		7.4	22	SB	4	C		40		FDE
HOLL	30	1418	1419	1427	N18	E67	.944		7.6	9	SB	3	C		50		
HOLL	30	1431	1437	1444	N18	E66	.939		7.6	13	SB	3	C		19		
RAMY	30	1503	1544	1702	N19	E64	.929	15508	7.4	119	1B	4	C		180		F
RAMY	30	1510	1512	1522	S27	E68	.922		7.7	12	SN	4	C		13		
HOLL	30	1530	1548	1703	N18	E65	.933	15508	7.5	93	1B	3	C		191		U F
HOLL	30	1530	1544	1545D	N18	E66	.939	15508	7.6	15D	1B	3	C		214		U F
RAMY	30	1534	1544	1550D	N19	E64	.929	15508	7.4	16D	1B	3	V		180		
RAMY	30	1727	1727	1732	N19	E63	.923		7.5	5	SN	4	C		13		
HOLL	30	1741	1746	1803	N18	E65	.933		7.6	22	SB	3	C		27		
RAMY	30	1746	1746	1819	N19	E62	.917		7.4	33	SB	3	C		19		F
HOLL	30	1832	1838	1856	N18	E64	.927		7.6	24	SB	3	C		31		
PALE	30	1837E	1838	1905D	N18	E63	.921		7.5	28D	SB	3	C		23		FDE
HOLL	30	1908	1908	1918	S30	E72	.945		8.2	10	SN	3	C		8		
PALE	30	1909E	1915U	1933D	N18	E63	.921		7.5	24D	SN	3	C		14		DE
HOLL	30	1911	1914	1918	N18	E64	.927		7.6	7	SN	3	C		19		FDE
HOLL	30	2040	2045	2051	S30	E72	.945		8.3	11	SN	3	C		18		
PALE	30	2131	2131	2135	S30	E67	.917		7.9	4	SN	3	C		21		DE
HOLL	30	2213	2217	2224	S30	E71	.939		8.3	11	SN	3	C		46		
PALE	30	2217	2218	2222	S30	E67	.917		8.0	5	SN	3	C		48		DE
HOLL	30	2238	2243	2256	S30	E70	.934		8.2	18	SB	2	C		70		
HOLL	30	2313	2317	2322	S30	E70	.934		8.2	9	SN	2	C		19		
PALE	30	2316	2317	2322	S30	E66	.911		7.9	6	SN	3	C		21		DE

Hα SOLAR FLARES

AUGUST 1978

OBSERVATORY	OBSERVED UT				LOCATION					DURATION — MIN.	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE AUG	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY			COND.	TYPE	TIME — UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
PALE	30	2316	2319	2337	N17	E60	.899		7.5	21	SN	3	C		47		DE
HOLL	30	2331	2345	2352	S30	E70	.934		8.2	21	SN	2	C		24		
PALE	30	2332	2337	2346	S30	E66	.911		7.9	14	SN	3	C		16		DE
PALE	31	0137	0139	0144	S30	E65	.905		7.9	7	SN	3	C		48		DE
TEHR	31	0527	0533	0603	N17	E57	.877		7.5	36	SB	2	C		95		F
RAMY	31	1306	1306	1343	N10	W32	.591		1.1	37	SB	4	C		23		U
RAMY	31	1324	1328	1345	N21	E 8	.489		4.2	21	SN	4	C		51		
UPIC	31	1400E		1435D	S25	E90	.999	15518	10.3	35D	2B		P	1400			
RAMY	31	1548	1549	1607	N21	E 7	.486		4.2	19	SB	4	C		64		FDE
HOLL	31	1549	1551	1605	N22	E 6	.497		4.1	16	SB	3	C		90		F
HOLL	31	1626	1701	1730	S30	E61	.878	15509	8.3	64	1B	3	C		177		.U F
RAMY	31	1629	1629	1643	N21	E 7	.486		4.2	14	SN	4	C		21		F
RAMY	31	1633	1633	1652	S27	E55	.826		7.8	19	SN	4	C		13		F
RAMY	31	1657	1702	1726	S27	E55	.826	15510	7.8	29	1B	4	C		154		
RAMY	31	1900	1900	1902D	N18	E49	.815		7.5	2D	SN	3	C		18		
PALE	31	2129	2143	2157	N18	E42	.749		7.0	28	SN	3	C		38		FDE
PALE	31	2156	2157	2202	S21	E33	.570		6.4	6	SN	3	C		57		
HOLL	31	2156E	2157U	2206	S20	E32	.552		6.3	10D	SN	2	C		54		F
PALE	31	2222	2237	2242	N17	E48	.801		7.5	20	SN	3	C		134		DE
PALE	31	2250	2254	2318	N17	E48	.801		7.6	28	SB	3	C		128		DE
PALE	31	2321	2354	0006	N17	E47	.792		7.5	45	SN	3	C		22		DE

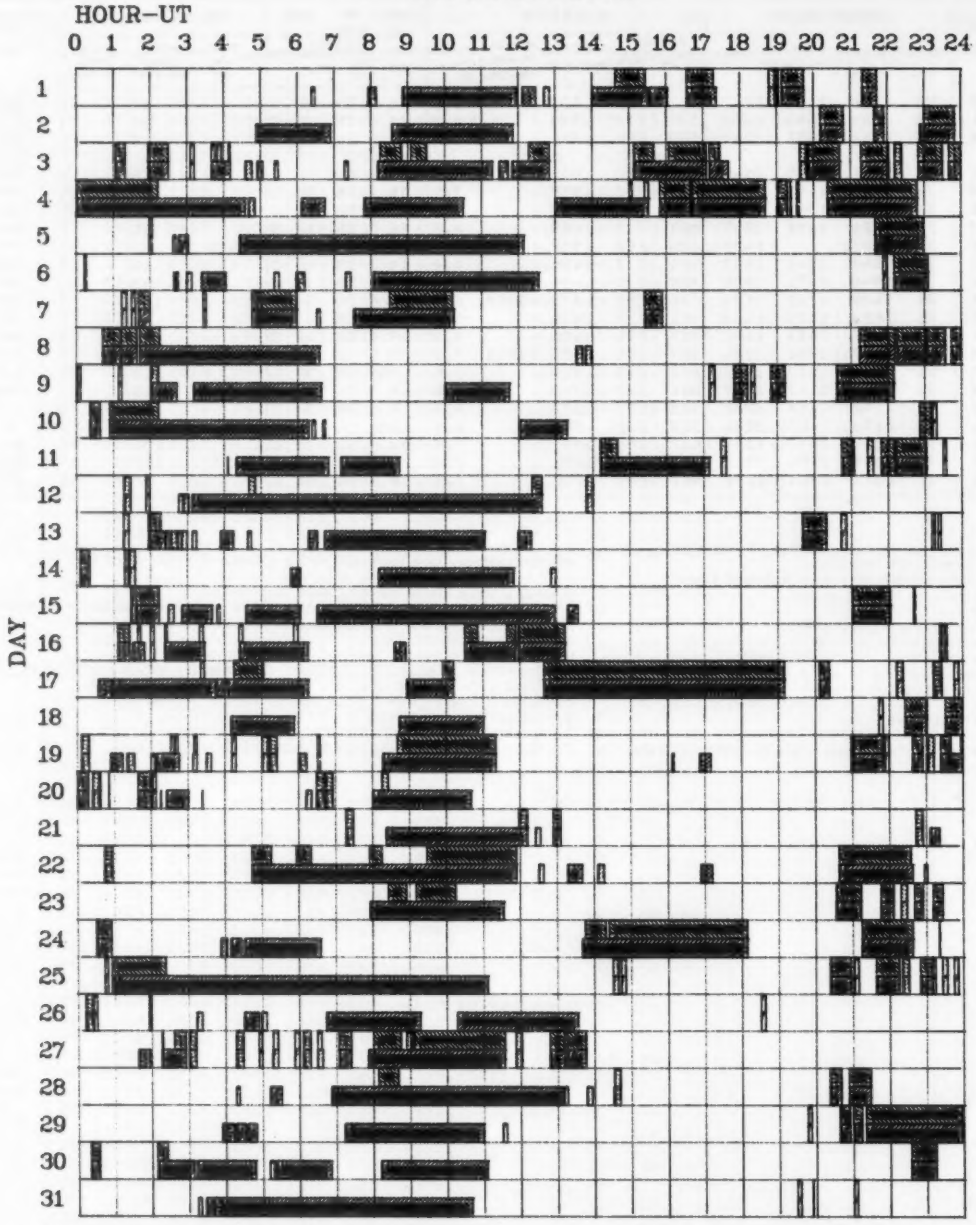
"Remarks":

A = Eruptive prominence whose base is less than 90° from central meridian.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No visible spots in the neighborhood.
H = Flare accompanied by a high speed dark filament.
I = Active region very extended.
J = Distinct variations of plage intensity before or after the flare.
K = Several intensity maxima.
L = Existing filaments show signs of sudden activity.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the calcium II lines H and K.
P = Flare shows helium D_3 in emission.
Q = Flare shows the Balmer continuum in emission.
R = Marked asymmetry in Hα line suggests ejection of high velocity material.
S = Brightness follows disappearance of filament (same position).
T = Region active all day.
U = Two bright branches, parallel (||) or converging (Y).
V = Occurrence of an explosive phase: important and abrupt expansion in about a minute with or without important intensity increase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide Hα line.
Y = System of loop-type prominences.
Z = Major sunspot umbra covered by flare.

INTERVALS OF NO FLARE PATROL OBSERVATION

FOR PRECEDING SOLAR FLARE TABLE

AUGUST 1978



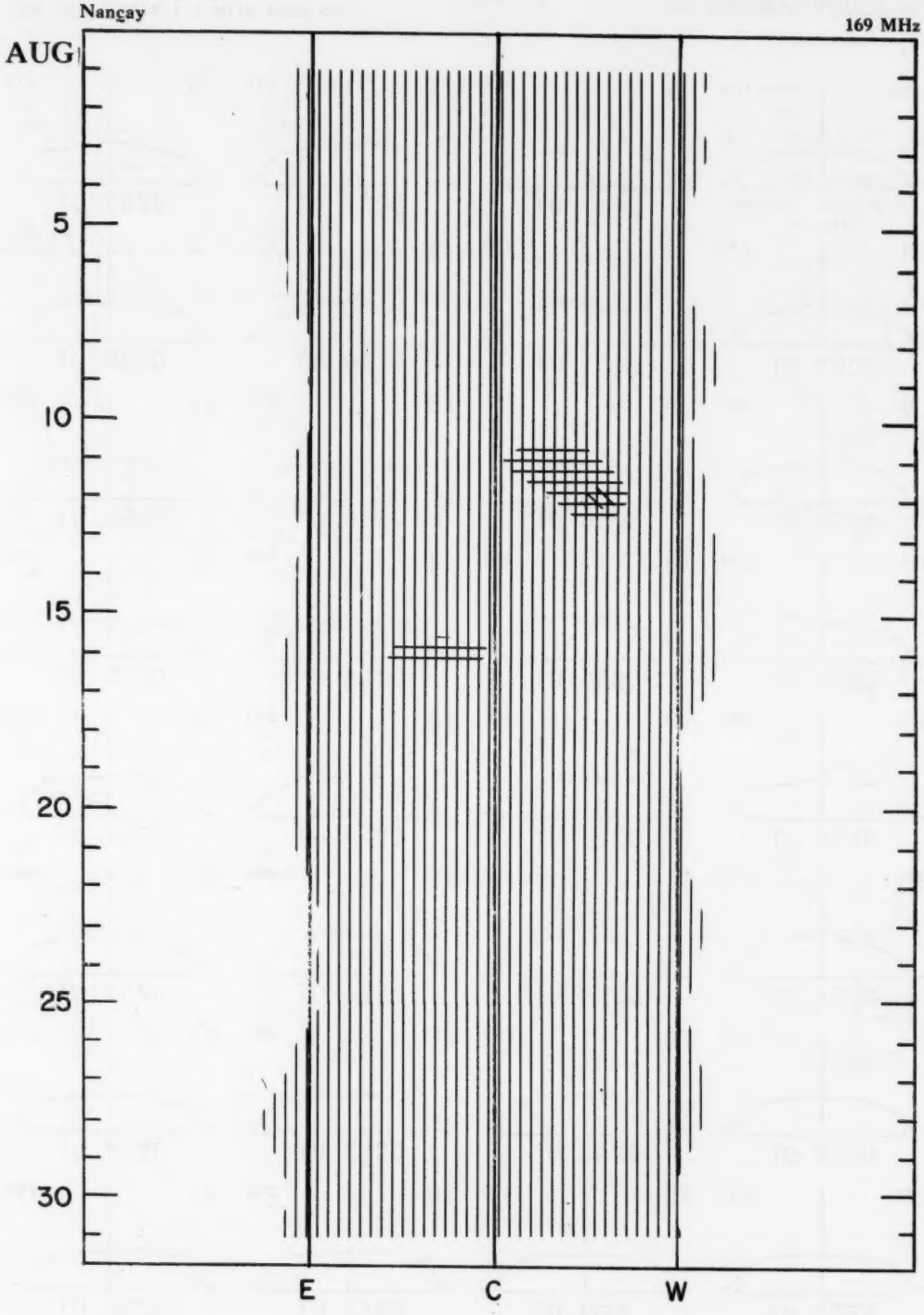
Observatories included in total patrol:

Bucharest	Holloman	Kandilli	Mitaka	Ramey	Upice
Herstmonceux	Istanboul	Manila	Palehua	Tehran	Wendelstein

Times of no flare patrol are shown by the shaded area for each day, divided into times of no cinematographic patrol (bottom half of day) and times of neither visual nor cinematographic patrol (top half of day).

SOLAR RADIO EMISSION
INTERFEROMETRIC OBSERVATION

AUGUST 1978



18
Aug 78

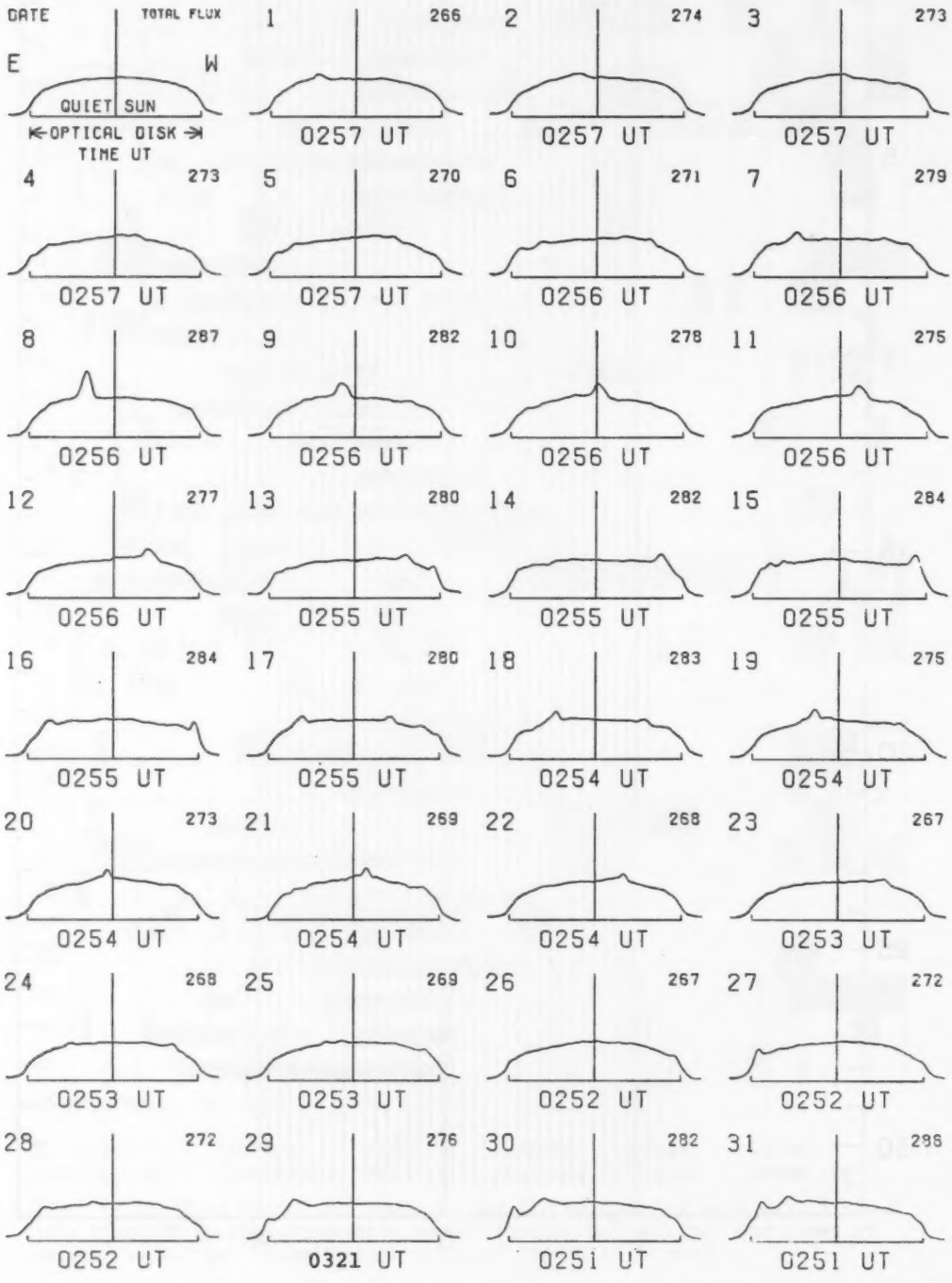
EAST-WEST SOLAR SCANS

AUGUST 1978

TOYOKAWA, JAPAN

3 CM

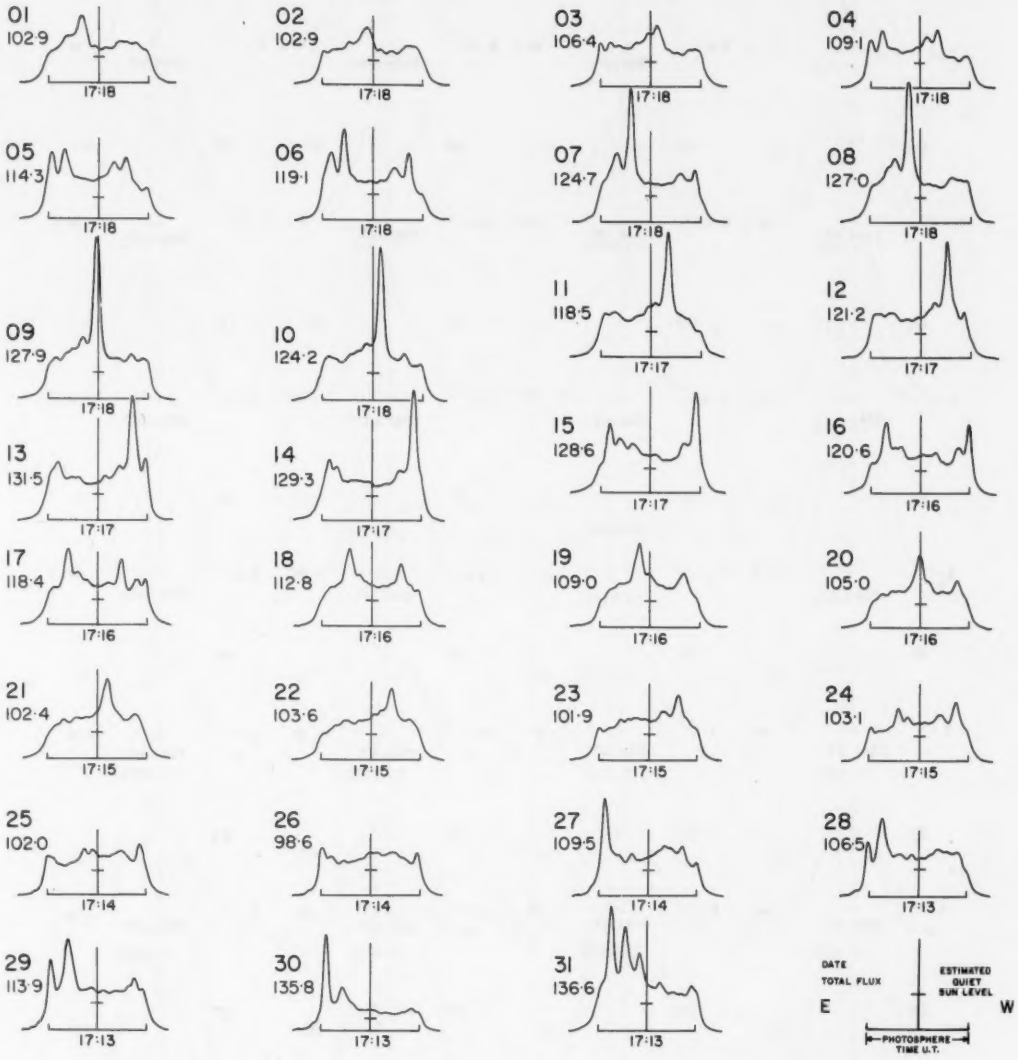
FAN BEAM WITH 1.1 MINUTES OF ARC



EAST-WEST SOLAR SCANS
AUGUST 1978

ALGONQUIN RADIO OBSERVATORY
CANADA

10·7cm
Fan Beam with 1·5 minutes of arc
E-W Resolution



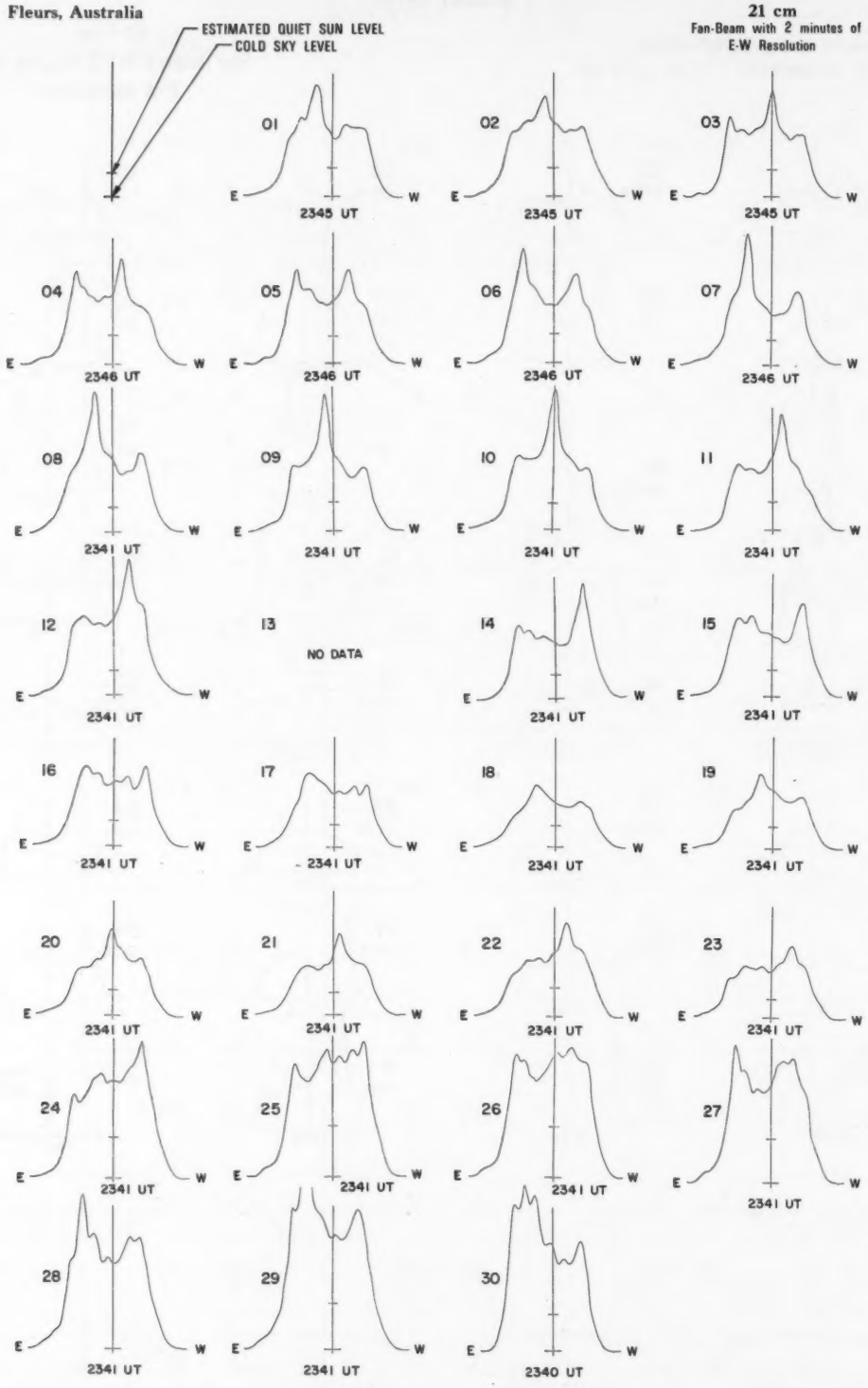
20
Aug 78

EAST-WEST SOLAR SCANS

AUGUST 1978

Fleurs, Australia

21 cm
Fan-Beam with 2 minutes of arc
E-W Resolution

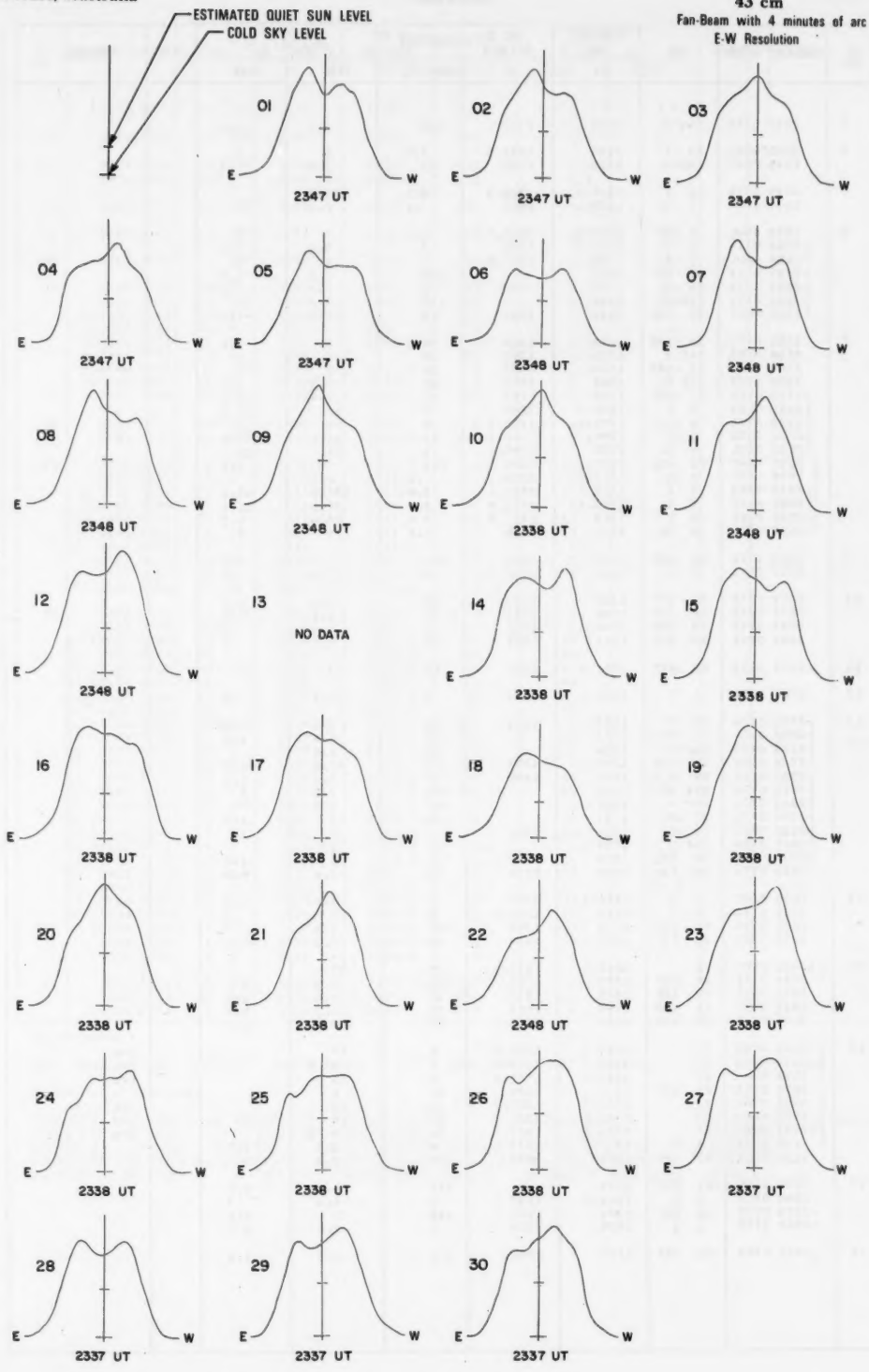


EAST-WEST SOLAR SCANS

AUGUST 1978

Fleurs, Australia

43 cm
Fan-Beam with 4 minutes of arc
E-W Resolution



SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS
AUGUST 1978

AUG 1978	FREQUENCY	STATION	TYPE	STARTING TIME	TIME OF MAXIMUM	DURATION	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1}		INT	REMARKS
				UT	UT	MINUTES	PEAK	MEAN		
1	2800	OTTA	240 R	2035	2300	145	3.6	1.5		
3	2695	BOUL	40 F	1840	1841.5	6.5	9	3		
	2695	PENT	240 R	2310	2400	50	2.2	.8		
4	2800	OTTA	40 F	1335.5	1338.9	6.5	13.2			
	2800	OTTA	8 S	1625	1625	.1	2.2			
6	2695	BOUL	2 SF	0115.5	0116.5	2.5	5	2		
	2800	OTTA	1 S	1251.5	1252	3	5.6	1.9		
	2695	BOUL	1 S	1252	1252.5	1	3	1		
	2800	OTTA	27 RF	1955		265	2.2	1.9		
	2800	OTTA	24 R	1955	2045	50	2.2	1.1		
	2800	OTTA	24P R	2045		195	2.2			
	2695	PENT	26 FAL	2400	2418	20	-2.2	-1.1		
7	2800	OTTA	20 GRF	1228	1303	65	2	1.6		
	2800	OTTA	240 R	1335	1350	15	2	1		
	2800	OTTA	20 GRF	1425	1432	12	2	1		
	2800	OTTA	240 R	1500	1545	45	3.2	1.6		
	2800	OTTA	21 GRF	1705	1753	85	2.4	1.2		
	6800	SGHR	3 S	1754.7	1755	7	27	10.8		2
	2800	OTTA	4 S/F	1754.8	1755.1	5	29	10		
	2695	SGHR	3 S	1755	1755.3	10.4	18.6	7.5		2
	2695	BOUL	4 SF	1755	1755.5	3	30	10		
	2695	PENT	21 GRF	2110	2325	250	7	2.7		
	2695	PENT	8 S	2310.5	2310.5	.1	2.2			
	8800	MANI	3 S	2313.6	2315.6	3.6	131.5	43.8		
	2695	MANI	3 S	2313.9	2315.2	2.4	32.7	10.9		
	2695	PENT	3 S	2313	2315.5	7	23.4	5.2		
	2695	BOUL	4 SF	2314	2316	4.5	19	6		
9	2800	OTTA	20 GRF	1535	1618	240	6.2	3.1		
	2800	OTTA	1 S	2146	2148	8	1.6	.8		
10	2800	OTTA	20 GRF	1325	1328	13	2.6	1.3		
	2800	OTTA	20 GRF	1540	1550	20	1.8	.9		
	2800	OTTA	20 GRF	1740	1755	30	1.4	.7		
	2800	OTTA	20 GRF	1940	1952	15	1.6	.8		
11	2800	OTTA	20 GRF	1211.5	1212	18	3	1		
12	2800	OTTA	1 S	2121.8	2123	4	1.2	.6		
13	2800	OTTA	24 R	1103	1126	23	2.6	1.3		
	2800	OTTA	27 RF	1103		170	2.6	1.8		
	2800	OTTA	24P R	1126		59	2.6			
	2800	OTTA	26 FAL	1225	1353	88	-2.6	-1.3		
	2800	OTTA	24 R	1425	1455	30	2.2	1.1		
	2800	OTTA	27A RF	1425		486	2.2	2		
	2800	OTTA	24P R	1455		405	2.2			
	2800	OTTA	27 RF	1731		134	2	1.7		
	2800	OTTA	24 R	1731	1733	2	2	1		
	2800	OTTA	24P R	1733		97	2			
	2800	OTTA	26 FAL	1910	1945	35	-2	-1.2		
	2800	OTTA	26 FAL	2140	2230	50	-1.6	-.9		
14	2695	PENT	1 S	0016.3	0017	2	3.6	1.8		
	2800	OTTA	1 S	1618	1618.9	2	2	.7		
	2800	OTTA	22 GRF	1730	1855	225	3.8	2.2		
	2695	PENT	26 FAL	2350	2430	40	-2.2	-1.1		
15	10400	BERN	4	1013.6	1015.4	19	50			
	2800	OTTA	20 GRF	1330	1550	240	5.6	3		
	2800	OTTA	20 GRF	1825	1839	35	3.4	1.6		
	2800	OTTA	20 GRF	1925	1950	95	2.2	1.1		
	2695	PENT	20 GRF	2200	2300	90	2.2	1.1		
16	8400	BERN	23	1203.2	1205.2	5	17			OPR
	10400	BERN	23	1203.2	1205.2	5	8 U			OPR
	8900	BERN	23	1203.2	1205.2	5	14			OPR
	2800	OTTA	21 GRF	1322	1325	70	4			
	8900	BERN	23	1324.3	1327.7	11	20			OPR
	8400	BERN	23	1324.3	1327.7	11	25			OPR
	10400	BERN	23	1324.3	1327.7	11	9 U			OPR
	2800	OTTA	1 S	1330	1333.5	5	3.2	1.5		
	2800	OTTA	20 GRF	1955	2035	155	2.8	1.4		
17	2800	OTTA	21 GRF	1310		270	4.4	2.2		
	2800	OTTA	1 S	1630.5	1632	5	1.4	.7		
	2800	OTTA	21 GRF	1903	1955	180	5	2.5		
	2800	OTTA	1 S	1935	1937	9	3.6	1.7		
18	2800	OTTA	21 GRF	1115	1243	360	3.2	1.6		

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS
AUGUST 1978

AUG 1978	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	REMARKS
	2800	OTTA	20 GRF	1154	1156	20	2	1		
21	2800	OTTA	20 GRF	1705	1800	175	3.6	2		
22	2800	OTTA	20 GRF	1525	1550	35	1.4	.7		
	2800	OTTA	240 R	2147	2150	3	1.2	.6		
23	2800	OTTA	20 GRF	1120	1250	330	4.2	2.1		
24	2800	OTTA	20 GRF	1727	1810	110	1.2	.7		
25	2800	OTTA	20 GRF	1200	1207	90	3.6	1.2		
27	2800	OTTA	240 R	1237	1357	80	2.8	1.4		
	2800	OTTA	20 GRF	1545	1725	175	5.2	3.3		
	2800	OTTA	27A RF	1924		135	1.2	1		
	2800	OTTA	24 R	1924	1946	22	1.2	.6		
	2800	OTTA	1 S	1944	1945.3	2.5	2.2	.8		
	2800	OTTA	24P R	1946		96	1.2			
	2800	OTTA	2 S/F	2037	2037.5	5	5.4	1.8		
	2695	BOUL	45 C	2038	2038	2	3	1		
	2800	OTTA	26 FAL	2122	2139	17	-1.2	-.6		
28	2800	OTTA	240 R	1455	1500	5	1.6	.8		
	2800	OTTA	20 GRF	1545	1640	115	1.8	.9		
29	2695	MANI	3 S	0252.5	0252.9	2.5	41.6	13.5		
	8800	MANI	3 S	0253.3	0252.9	1.5	8.5	3.6		
	8400	BERN	22	1411.1	1411.8	3	13 U			
	10400	BERN	22	1411.1	1411.8	3	8 U			
	8900	BERN	22	1411.1	1411.8	3	12 U			
	2695	BOUL	4 SF	1412	1413	3	13	4		
	2800	OTTA	1 S	1801	1801.2	1	1.4	.7		
	2695	PENT	240AR	2005	2030	25	2.2	1.1		
	2695	PENT	1 S	2024.5	2026.5	3.5	4	2		
	2695	BOUL	2 SF	2026 E	2027.5	3 D	4	1		
30	2800	OTTA	2 S/F	1339	1340	7	3	1		
	2800	OTTA	240 R	1440	1510	30	2.6	1		
	10400	BERN	46	1536	1542.9	54	119			
	8900	BERN	46	1536	1542.9	54	169			
	8400	BERN	46	1536	1542.9	54	162			
	10400	BERN	46	1536	1538.3	54	53			
	8900	BERN	46	1536	1538.3	54	68			
	8400	BERN	46	1536	1538.3	54	70			
	2800	OTTA	240AR	1536	1800	144	4.4			
	8800	SGMR	3 S	1537	1542.6	26	165	66		SWF
	2800	OTTA	45 C	1537	1544	23	84	18.6		
	2800	OTTA	30 PBI	1600	1600	115	9.8	4.9		
	2695	SGMR	3 S	1538	1545.3	25	93	37.2		SWF
	2695	BOUL	41 F	1538.5	1645.5	114.50	153	51		
	2800	OTTA	2 S/F	1610.5	1611.3	2	4.4	2		
	2800	OTTA	3 S	1612.9	1613.5	4	12	3.4		
	2695	SGMR	3 S	1613	1613.7	4.5	10.5	3.2		CONT
	2800	OTTA	1 S	1618.2	1618.7	1.8	2.6	1.3		
	2695	SGMR	3 S	1630.6	1650.3	52.6	166	66.4		CONT
	2800	OTTA	4 S/F	1630	1645	65	170	39		
	8800	SGMR	3 S	1631.2	1644.8	48.1	132	52.8		CONT
	8900	BERN	4	1633.2	1644.4	60	103			
	8400	BERN	4	1633.2	1644.4	60	112			
	10400	BERN	4	1633.2	1644.4	60	112			
	2800	OTTA	1 S	2059	2059.5	1	7.6	3		
	2695	BOUL	1 S	2100	2100.5	1	8	3		
31	2800	OTTA	20 GRF	1300	1350	140	4.4	2.6		
	2800	OTTA	22 GRF	1530	1600	205	4	2		
	2800	OTTA	22 GRF	1920	2035	160	4.6	2.6		

Observatories:

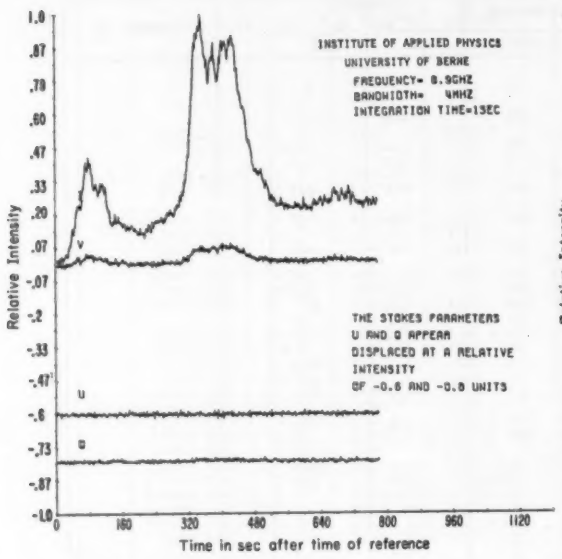
BERN = Berne BOUL = Boulder MANI = Manila OTTA = Ottawa ARO PENT = Penticton SGMR = Sagamore Hill

Explanation of Type Code:

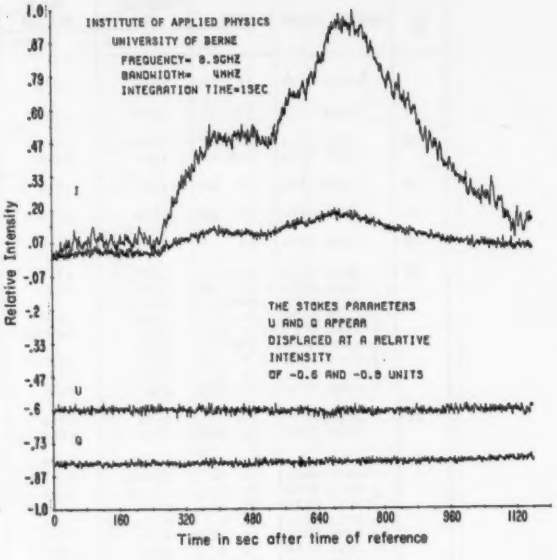
1 Simple 1 6 Minor 22 Simple 3F 27 Rise and Fall 32 Absorption 44 Noise Storm in Progress
2 Simple 1F 7 Minor + 23 Simple 3AF 28 Precursor 40 Fluctuation 45 Complex
3 Simple 2 8 Spike 24 Rise 29 Post Burst Increase 41 Group of Bursts 46 Complex F
4 Simple 2F 20 Simple 3 25 Rise A 30 Post Burst Increase A 42 Series of Bursts 47 Great Burst
5 Simple 21 Simple 3A 26 Fall 31 Post Burst Decrease 43 Onset of Noise Storm 48 Major
49 Major +

SELECTED SOLAR NOISE BURSTS

30 August 1978



30 Aug 1978 1537 UT
1 Unit = 159 SFU



30 Aug 1978 1633 UT
1 Unit = 112 SFU

SOLAR X-RAYS BY SATELLITE
SMS GOES
AUGUST 1978

.5 - 4Å Hourly Averages (10^{-5} watts/m^2)

MO DA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Mean
8/ 1	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
8/ 2	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
8/ 3	B	B	B	B	.001	B	B	B	B	B	.004	B	B	B	.001	B	B	B	B	B	B	B	B	B	B
8/ 4	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
8/ 5	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
8/ 6	B	B	B	B	B	B	B	B	B	B	.001	.002	.001	B	B	B	B	B	B	B	.001	.001	B	B	B
8/ 7	B	B	B	B	B	B	B	B	B	B	B	.004	B	B	.002	.004	.002	.005	.002	.001	.001	.002	.002	.023	.004
8/ 8	.002	.001	.002	.002	.002	.003	.002	B	B	B	B	B	B	B	.001	B	B	B	.001	B	B	.001	B	B	B
8/ 9	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	.001	.002	B	B	B	B	B	B	B	B
8/10	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	.001	B	B
8/11	B	B	B	.001	B	B	B	B	B	B	B	.001	B	B	B	B	B	B	B	B	B	B	B	B	B
8/12	B	B	B	B	B	B	B	B	B	B	B	.002	B	B	B	B	B	B	B	B	B	B	B	B	B
8/13	B	B	B	B	B	B	B	B	B	B	.001	.003	.002	B	B	.002	B	.002	.003	.001	B	B	B	B	.001
8/14	.004	.001	B	B	B	B	.006	B	.008	.005	.001	B	B	B	B	B	.001	.003	.002	.001	.002	.003	B	B	.001
8/15	B	.004	.002	.002	B	B	B	B	.001	B	.010	B	B	.001	B	.007	.001	B	.003	B	B	B	.003	B	.002
8/16	B	B	B	B	B	.001	.004	B	B	.003	B	B	.002	.033	B	B	B	.002	B	B	.002	B	B	B	.004
8/17	.002	B	B	.003	B	B	B	B	B	B	B	B	.041	.002	.002	B	B	B	B	.003	.001	B	B	B	.004
8/18	B	M	B	B	B	B	B	B	B	B	B	B	.002	B	B	B	B	B	B	B	B	B	B	B	B
8/19	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
8/20	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
8/21	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
8/22	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
8/23	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
8/24	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
8/25	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
8/26	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	.001	B	B	B
8/27	B	B	.001	B	B	.002	B	.001	.002	.007	B	B	.002	B	B	.001	.017	.002	.003	B	.004	B	B	.002	.003
8/28	B	B	B	B	B	.001	B	B	B	B	.002	B	B	B	B	B	.002	B	B	B	B	B	B	B	B
8/29	B	.006	B	B	B	B	.002	B	B	B	B	B	B	B	B	B	B	B	.003	.002	.006	.002	.001	B	.001
8/30	B	B	B	.002	B	B	B	.002	B	B	B	B	B	B	B	.130	.034	.006	.005	.004	.002	.001	.002	.003	.015
8/31	B	.002	.001	.003	.015	.019	.002	.001	.001	.001	B	B	.001	.002	B	B	.002	.007	.002	.003	.002	.001	.001	.001	.002

Note: "B" indicates the flux was below the cut-off levels.
"M" denotes periods of missing data.

SOLAR X-RAYS BY SATELLITE
SMS GOES
AUGUST 1978

1 - 8Å Hourly Averages (10^{-4} watts/m^2)

MO DA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Mean
8/ 1	.001	.002	.001	.002	.001	.002	.002	.001	.001	.001	.001	.001	.001	.001	.001	.001	.002	.001	.001	.001	.001	.001	.003	.002	B
8/ 2	.002	.002	.001	.001	.001	.002	.001	.001	.001	.001	.001	.002	.002	.001	.001	.002	.002	.002	.002	.002	.002	.002	.002	.002	B
8/ 3	.002	.002	.004	.003	.005	.005	.003	.003	.002	.003	.002	.003	.003	.002	.004	.003	.002	.002	.003	.004	.003	.004	.002	.005	.002
8/ 4	.005	.005	.005	.003	.003	.003	.003	.003	.003	.002	.002	.002	.002	.002	.002	.002	.003	.002	.002	.003	.002	.002	.002	.002	.001
8/ 5	.002	.002	.002	.003	.002	.002	.002	.002	.003	.002	.003	.004	.003	.004	.003	.003	.003	.004	.004	.004	.003	.003	.003	.003	.002
8/ 6	.004	.003	.003	.005	.003	.003	.004	.004	.003	.004	.006	.008	.006	.004	.003	.004	.004	.004	.004	.004	.006	.006	.005	.004	.003
8/ 7	.003	.003	.003	.003	.003	.003	.004	.003	.004	.004	.004	.010	.006	.005	.008	.012	.010	.010	.007	.005	.005	.008	.007	.008	.007
8/ 8	.010	.006	.006	.008	.008	.009	.009	.006	.003	.003	.003	.004	.005	.004	.006	.005	.004	.004	.003	.003	.004	.005	.004	.004	.002
8/ 9	.003	.003	.004	.004	.004	.004	.004	.004	.003	.003	.003	.003	.003	.003	.003	.005	.008	.004	.003	.003	.003	.003	.003	.003	.002
8/10	.003	.003	.004	.004	.004	.004	.003	.003	.003	.003	.003	.003	.003	.004	.003	.004	.004	.004	.003	.003	.003	.003	.002	.003	.002
8/11	.003	.003	.004	.005	.004	.003	.002	.003	.004	.003	.003	.005	.005	.003	.003	.003	.003	.003	.003	.003	.003	.003	.004	.003	.002
8/12	.003	.004	.003	.003	.003	.003	.002	.002	.003	.003	.003	.008	.003	.003	.003	.003	.003	.004	.005	.004	.004	.004	.004	.005	.002
8/13	.004	.005	.005	.004	.005	.003	.004	.004	.006	.006	.007	.011	.012	.006	.007	.009	.007	.009	.011	.006	.005	.005	.005	.005	.004
8/14	.011	.007	.005	.005	.005	.005	.014	.006	.020	.021	.010	.008	.007	.016	.005	.005	.007	.010	.010	.008	.009	.010	.007	.006	.005
8/15	.006	.011	.008	.007	.005	.006	.006	.007	.008	.007	.014	.005	.005	.006	.007	.013	.008	.005	.012	.007	.006	.005	.012	.006	.005
8/16	.004	.004	.005	.005	.006	.006	.014	.007	.004	.008	.005	.004	.007	.035	.007	.003	.004	.004	.005	.005	.008	.005	.004	.005	.006
8/17	.009	.006	.005	.008	.004	.005	.004	.005	.005	.004	.004	.004	.004	.008	.009	.005	.005	.004	.004	.009	.007	.004	.004	.004	.005
8/18	.004	M	.005	.005	.004	.004	.004	.004	.003	.006	.003	.003	.006	.006	.003	.002	.002	.003	.002	.003	.002	.002	.003	.002	.002
8/19	.002	.002	.003	.003	.002	.002	.002	.002	.002	.002	.002	.002	.002	.002	.002	.002	.001	.002	.001	.002	.002	.001	.001	.001	B
8/20	.002	.002	.002	.003	.001	.002	.002	.001	.001	.001	.001	.001	.002	.002	.002	.001	.002	.001	.002	.002	.002	.002	.001	.001	B
8/21	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.001	.002	.001	.001	.001	.004	.003	.002	.002	.001	.001	.001	B
8/22	.002	.001	.001	.001	.002	.002	.002	.002	.002	.001	.002	.001	.001	.001	.001	.002	.004	.002	.002	.002	.002	.002	.002	.002	B
8/23	.002	.002	.002	.001	.002	.001	.001	.002	.002	.002	.002	.002	.003	.002	.002	.002	.001	.001	.001	.001	.001	.001	.003	.002	B
8/24	.002	.002	.002	.002	.002	.002	.003	.002	.002	.002	.001	.002	.001	.002	.002	.002	.002	.002	.003	.002	.002	.002	.001	.002	B
8/25	.001	.001	.002	.001	.002	.002	.001	.002	.001	.002	.002	.002	.004	.002	.002	.002	.002	.002	.002	.001	.001	.001	.001	.002	.001
8/26	.002	.002	.001	.001	.001	.002	.001	.001	.002	.001	.001	.001	.001	.001	.001	.002	.001	.001	.001	.001	.002	.003	.003	.003	.001
8/27	.002	.003	.003	.004	.003	.006	.003	.004	.006	.015	.007	.004	.007	.005	.004	.005	.029	.013	.009	.009	.008	.003	.003	.005	.006
8/28	.003	.003	.004	.005	.003	.005	.004	.004	.004	.004	.006	.003	.004	.003	.003	.004	.006	.004	.004	.004	.004	.004	.004	.004	.002
8/29	.005	.013	.005	.005	.007	.006	.006	.004	.005	.005	.005	.004	.005	.003	.005	.004	.004	.004	.007	.005	.011	.006	.006	.005	.003
8/30	.004	.005	.004	.006	.005	.006	.005	.007	.005	.005	.006	.005	.005	.006	.006	.003	.049	.016	.014	.012	.010	.009	.009	.012	.007
8/31	.007	.007	.007	.009	.026	.021	.007	.008	.008	.008	.007	.007	.008	.013	.010	.010	.012	.015	.008	.008	.008	.007	.009	.008	.006

Note: "B" indicates the flux was below the cut-off levels.
"M" denotes periods of missing data.

SOLAR X-RAYS BY SATELLITE

GOES

AUGUST 1978

DAY	BEGIN TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}	MAX TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}	1/2P TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}
3	0957	1.7E-08	4.8E-07	1005	2.5E-07	2.7E-06	1010	7.7E-08	1.5E-06
5	1348	0.0E+00	2.6E-07	1356	1.0E-07	1.9E-06	1359	2.8E-08	9.4E-07
6	1250	4.1E-09	5.1E-07	1253	8.5E-08	1.4E-06	1258	2.2E-08	9.3E-07
7	1107	1.1E-08	5.2E-07	1123	8.8E-08	1.8E-06	1133	3.6E-08	1.1E-06
7	1753	2.7E-08	9.4E-07	1758	4.2E-07	3.5E-06	1802	8.8E-08	1.9E-06
7	2307	7.0E-08	1.2E-06	2322	6.9E-07	5.1E-06	2341	1.4E-07	3.1E-06
8	0157	1.1E-08	5.1E-07	0201	8.1E-08	1.3E-06	0203	2.9E-08	8.1E-07
11	0339	4.9E-09	4.0E-07	0344	7.2E-08	1.1E-06	0348	1.9E-08	7.3E-07
12	1108	6.4E-09	3.7E-07	1119	8.4E-08	2.0E-06	1126	3.9E-08	1.1E-06
13	1055	1.3E-08	7.7E-07	1101	7.6E-08	2.0E-06	1120	3.9E-08	1.4E-06
13	1218	5.7E-09	6.8E-07	1223	1.1E-07	1.9E-06	1232	3.2E-08	1.2E-06
13	1422	5.4E-09	4.9E-07	1537	2.4E-08	1.1E-06	1600	7.6E-09	8.2E-07
13	1755	1.6E-08	8.2E-07	1801	1.5E-07	2.9E-06	1805	5.8E-08	1.7E-06
14	0003	3.9E-09	5.2E-07	0020	1.3E-07	2.2E-06	0030	3.9E-08	1.3E-06
14	0122	3.9E-09	5.6E-07	0128	7.1E-08	1.4E-06	0132	1.6E-08	9.3E-07
14	0609	2.7E-08	8.0E-07	0621	1.9E-07	3.0E-06	0631	5.2E-08	1.9E-06
14	0819	1.9E-08	8.9E-07	0841	1.4E-07	3.4E-06	0933	4.4E-08	2.1E-06
14	1734	7.2E-09	6.9E-07	1742	1.3E-07	2.4E-06	1749	3.8E-08	1.5E-06
14	2011	2.1E-08	8.7E-07	2017	6.4E-08	1.4E-06	2024	2.3E-08	1.1E-06
14	2056	2.3E-08	8.5E-07	2106	9.4E-08	1.9E-06	2112	3.2E-08	1.3E-06
15	0125	3.1E-08	9.1E-07	0134	1.3E-07	2.4E-06	0142	5.2E-08	1.6E-06
15	0239	8.6E-09	7.3E-07	0243	4.7E-08	1.1E-06	0246	2.4E-08	8.0E-07
15	0320	1.2E-08	7.4E-07	0323	3.8E-08	1.0E-06	0326	2.3E-08	8.4E-07
15	0842	5.1E-09	7.4E-07	0847	3.8E-08	1.2E-06	0852	1.2E-08	9.7E-07
15	1011	6.4E-09	6.0E-07	1017	1.1E-06	6.4E-06	1023	1.5E-07	3.3E-06
15	1542	2.3E-08	9.3E-07	1549	3.5E-07	3.4E-06	1602	6.2E-08	1.9E-06
15	1829	2.4E-08	7.7E-07	1844	1.3E-07	2.6E-06	1849	3.7E-08	1.6E-06
15	2201	2.9E-08	9.6E-07	2205	7.5E-08	1.9E-06	2220	4.2E-08	1.4E-06
16	0551	1.0E-08	6.2E-07	0557	8.1E-08	1.4E-06	0605	2.4E-08	1.0E-06
16	0632	2.9E-08	1.1E-06	0641	1.3E-07	2.5E-06	0649	4.4E-08	1.9E-06
16	0908	2.1E-08	4.1E-07	0928	7.3E-08	1.5E-06	0938	1.5E-08	9.6E-07
16	1201	4.4E-09	4.7E-07	1206	9.3E-08	1.4E-06	1220	2.5E-08	9.2E-07
16	1321	1.8E-08	6.6E-07	1334	1.5E-06	1.0E-05	1346	2.6E-07	5.5E-06
17	0003	2.7E-08	1.1E-06	0006	6.1E-08	1.9E-06	0008	2.9E-08	1.1E-06
17	0337	5.6E-09	5.5E-07	0343	3.3E-07	3.5E-06	0348	4.5E-08	1.6E-06
17	1935	6.1E-09	5.5E-07	1944	7.6E-08	1.4E-06	2011	2.1E-08	9.7E-07
18	1237	2.2E-08	5.6E-07	1246	4.6E-08	1.0E-06	1308	1.7E-08	8.8E-07
25	1154	6.2E-10	1.7E-07	1208	6.4E-08	1.0E-06	1213	1.4E-08	5.5E-07
26	2149	2.9E-09	1.6E-07	2155	1.4E-07	1.7E-06	2201	2.8E-08	9.0E-07
27	0004	2.3E-09	1.6E-07	0007	1.2E-07	1.2E-06	0009	1.5E-08	4.2E-07
27	0135	2.9E-09	1.6E-07	0138	1.3E-07	1.3E-06	0140	2.4E-08	5.9E-07
27	0504	6.2E-09	3.2E-07	0527	1.2E-07	1.7E-06	0529	3.2E-08	9.1E-07
27	0820	3.1E-09	2.4E-07	0833	1.5E-07	1.9E-06	0836	4.6E-08	1.0E-06
27	0909	1.8E-08	6.5E-07	0926	2.3E-07	3.5E-06	0933	5.8E-08	1.9E-06
27	1213	2.9E-09	3.5E-07	1219	1.2E-07	1.8E-06	1225	3.5E-08	1.0E-06
27	1557	6.2E-09	5.0E-07	1628	9.1E-07	8.3E-06	1635	2.0E-07	4.3E-06
27	1840	5.9E-09	4.0E-07	1849	1.4E-07	2.3E-06	1900	4.2E-08	1.3E-06
27	2034	2.8E-09	3.0E-07	2039	4.8E-07	4.3E-06	2044	8.2E-08	2.1E-06
27	2332	3.2E-09	2.5E-07	2346	6.2E-08	1.1E-06	2355	1.3E-08	6.7E-07
28	0341	2.6E-09	3.2E-07	0350	4.4E-08	1.0E-06	0355	1.3E-08	6.7E-07
28	0533	3.4E-09	2.7E-07	0539	6.4E-08	1.0E-06	0551	1.2E-08	5.8E-07
29	0059	2.8E-08	6.7E-07	0108	1.3E-07	2.1E-06	0120	5.2E-08	1.3E-06
29	0602	1.1E-08	5.0E-07	0608	7.1E-08	1.0E-06	0615	2.5E-08	7.8E-07
29	1409	0.0E+00	2.9E-07	1413	7.5E-08	1.9E-06	1417	2.6E-08	1.0E-06
29	1900	8.9E-10	4.3E-07	1907	1.1E-07	1.3E-06	1922	1.0E-08	8.3E-07
29	2022	2.0E-08	5.6E-07	2033	1.8E-07	2.5E-06	2044	6.1E-08	1.5E-06
30	0259	1.5E-08	5.1E-07	0303	7.3E-08	1.2E-06	0306	3.3E-08	8.3E-07
30	1415	0.0E+00	5.1E-07	1419	9.4E-08	1.8E-06	1422	2.9E-08	9.9E-07
30	1501	3.3E-10	5.4E-07	1549	5.1E-06	2.9E-05	1559	1.4E-06	1.5E-05
30	1829	3.7E-08	1.2E-06	1836	1.5E-07	2.5E-06	1841	4.1E-08	1.7E-06
30	2237	7.3E-09	7.1E-07	2243	2.8E-07	2.4E-06	2245	5.5E-08	1.4E-06
30	2333	2.9E-08	1.2E-06	2336	6.4E-08	1.9E-06	2338	6.9E-08	1.6E-06
31	0059	5.1E-09	5.9E-07	0104	6.7E-08	1.3E-06	0107	1.6E-08	9.0E-07
31	0330	3.8E-08	1.0E-06	0342	9.0E-08	2.0E-06	0347	5.5E-08	1.4E-06
31	0402	3.4E-08	1.2E-06	0416	2.6E-07	3.5E-06	0425	9.7E-08	2.3E-06
31	0438	4.5E-08	1.6E-06	0441	4.6E-07	4.4E-06	0445	1.4E-07	2.7E-06
31	0503	1.5E-10	2.7E-08	0532	9.5E-07	6.3E-06	0542	1.5E-07	3.0E-06
31	0637	7.9E-09	5.9E-07	0641	1.1E-07	1.9E-06	0643	4.6E-08	1.2E-06
31	1547	6.9E-09	8.3E-07	1551	4.4E-08	1.9E-06	1601	1.0E-08	1.3E-06
31	1627	2.9E-08	1.3E-06	1630	4.5E-08	1.8E-06	1639	3.8E-08	1.6E-06
31	1656	1.7E-08	1.1E-06	1703	5.9E-07	5.5E-06	1709	1.2E-07	3.0E-06
31	1957	2.1E-08	7.5E-07	1907	3.9E-08	1.1E-06	1910	2.2E-08	9.2E-07
31	2248	5.2E-09	7.4E-07	2253	4.7E-08	1.7E-06	2255	2.7E-08	1.1E-06
31	2340	6.1E-09	7.2E-07	2347	4.5E-08	1.3E-06	2357	1.5E-08	1.0E-06

28
Aug 78

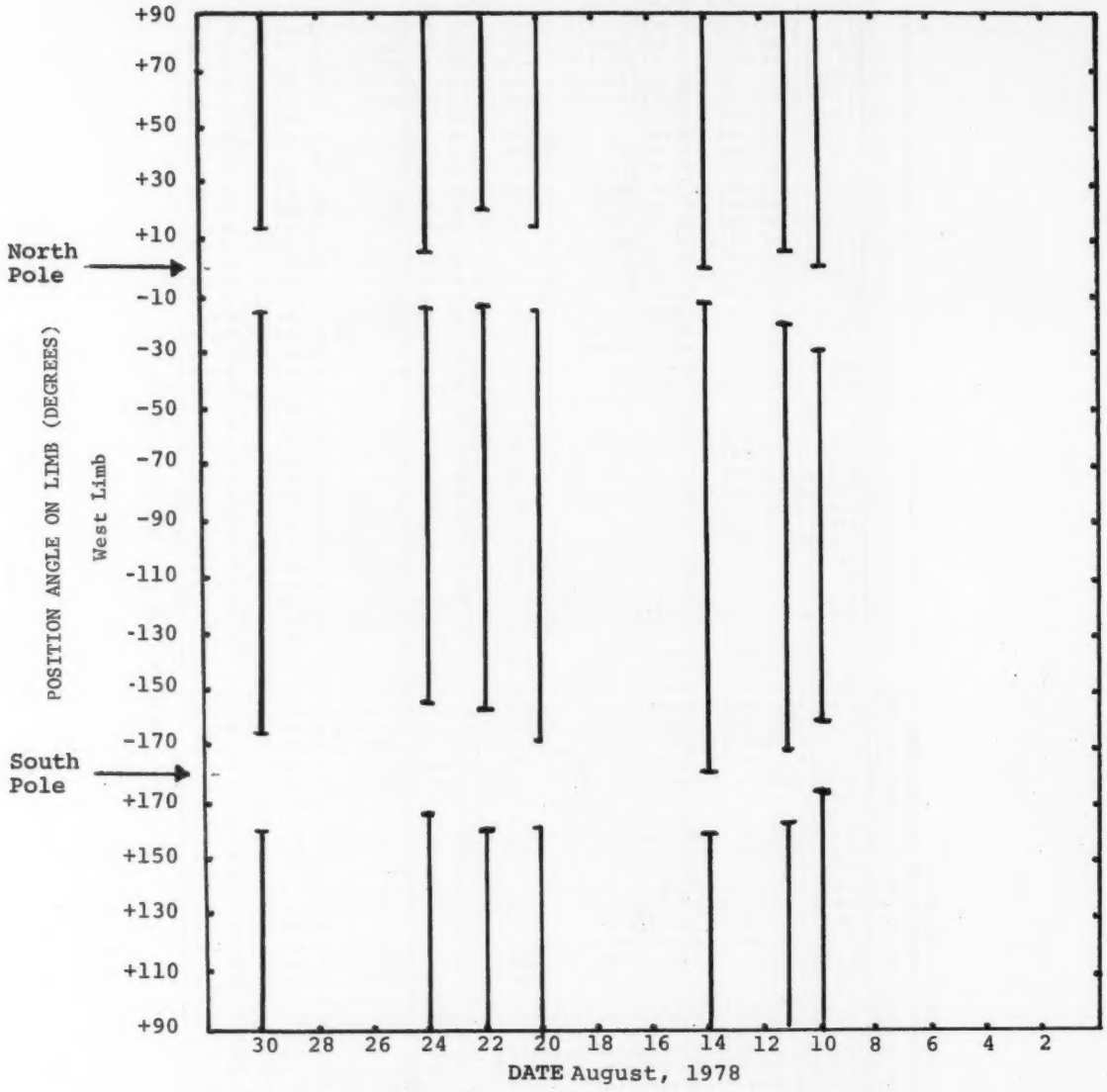
CORONAL HOLES

Helium D3 Chromosphere at Solar Limb

AUGUST 1978

Big Bear Solar Observatory

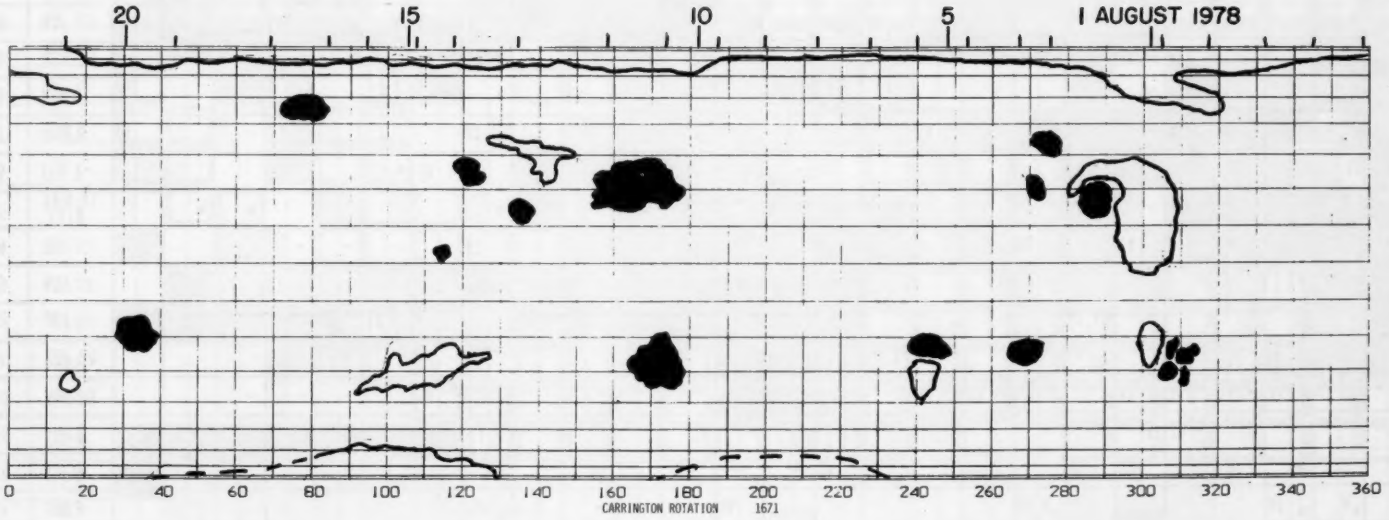
OBSERVATIONS OF D3 CHROMOSPHERE AT SOLAR LIMB



HELIUM 10830Å SYNOPTIC MAPS

CARRINGTON ROTATION 1671

KITT PEAK NATIONAL OBSERVATORY



29
Aug 78

INFERRED IP MAGNETIC FIELD

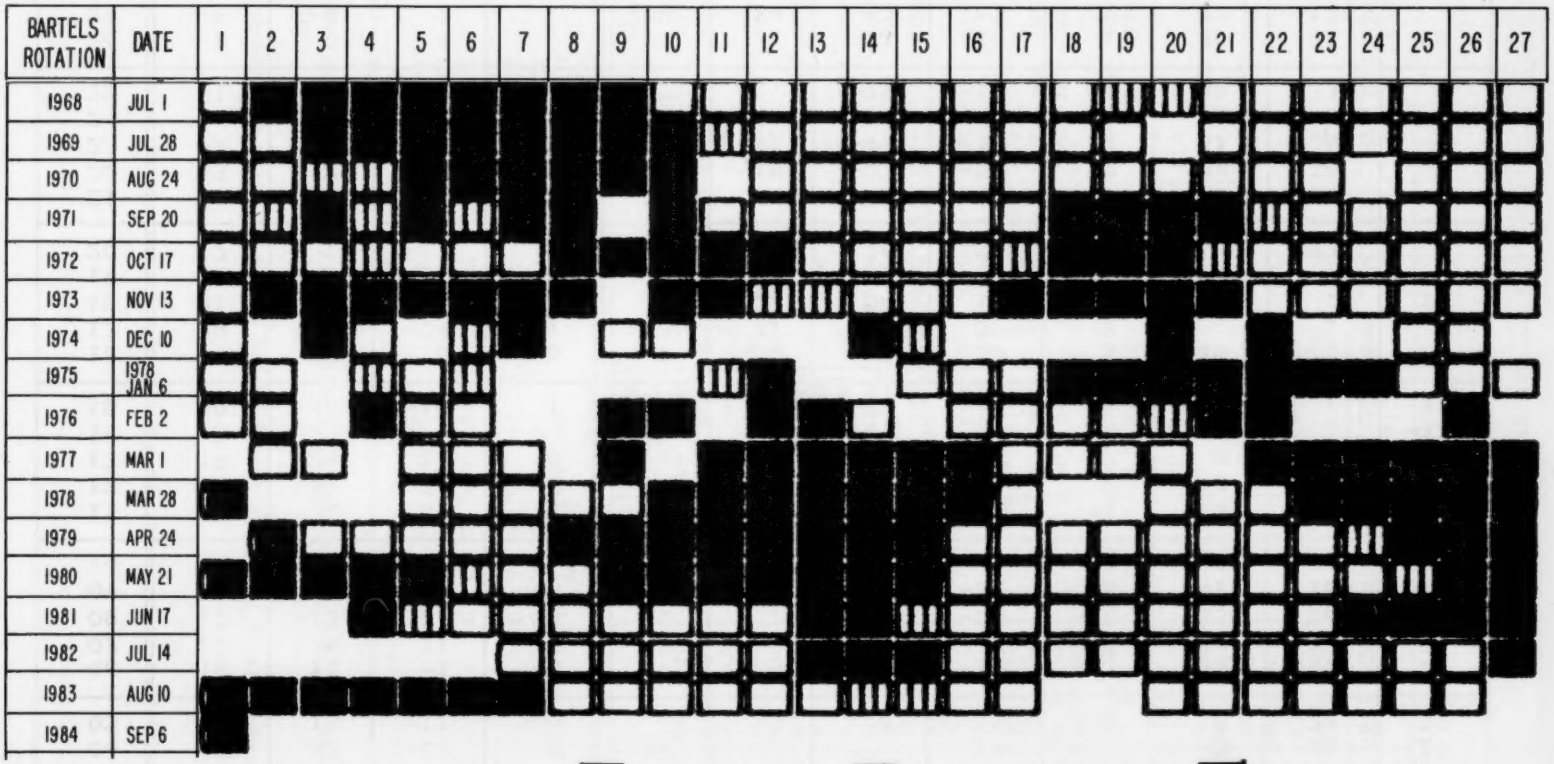
BARTELS ROTATION	DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1967	JUN 9								TA		-			TA						AT	A*								TA TA
1968	JUL 6										A*			T*	TA	TA		T*			AT				AT		-		
1969	AUG 2		TA						TA	-			TA	*									AT	TA					
1970	AUG 29			-	-	-		TA										AT	AT			AT	TA	TA	-	AT	AT		
1971	SEP 25						-		-	-	-	-					TA				TA								
1972	OCT 22					-	AT														AT	AT				*			
1973	NOV 18			TA	AT						-		AT							*			*		*			
1974	DEC 15				-	-	-		AT	-	AT				AT	AT		AT		TA		TA		TA			*		
1975	1978 JAN 11		*	*						*		*						*			TA	-	AT			-		-	
1976	FEB 7						*	TA				-				-						-	*			TA	A*	TA	
1977	MAR 6	TA		-					AT			T*	*					TA			AT	AT	AT	AT		*	TA			
1978	APR 2							*	-		AT											AT	AT							
1979	APR 29		TA		*		TA	AT	AT	TA	-	-	T*							TA	TA		AT						
1980	MAY 26				TA			AT	AT			-				AT	TA					-				-	-	-	-
1981	JUN 22	TA					A*					-	TA	TA	TA	AT			*				*	AT	AT	-		AT		
1982	JUL 19									TA							-	-		TA				AT	AT	*		TA		
1983	AUG 15					TA			AT		AT	AT		AT	TA															

▒ = definitely towards the sun □ = definitely away from the sun

T = towards the sun A = away from the sun * = effect doubtful or not discernible - = missing data

The table shows daily inferences of the polarity of the interplanetary magnetic field. The first half of the day is based principally on magnetograms produced by the magnetometer at the Vostok Antarctic Station of the USSR. The magnetometer of the U.S. Air Weather Service now operated at Thule by the Danish Meteorological Institute is used for the second half of the day.

STANFORD MEAN SOLAR MAGNETIC FIELD



POLARITY OF THE MEAN SOLAR MAGNETIC FIELD: □ = FIELD >2μT, ▥ = -2μT ≤FIELD ≤2μT, ■ = FIELD <-2μT

No box visible indicates no data available for that day.

Note: Data are taken daily at 2000 UT. Dates given are not Bartels Rotation dates. These earlier dates correspond to the occurrence of phenomena on the sun which affect the Earth during the given Bartels Rotation.

STANFORD MEAN SOLAR MAGNETIC FIELD (MICROTESLA)

	1977				1978							
DAY	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.
01	-9	9	6	-14	.	16	.	52	-12	-28	1	40
02	-13	6	1	-10	.	31	22	46	-34	-22	13	39
03	.	3	-14	-7	14	26	12	43	-27	-12	15	42
04	3	13	-16	8	31	.	.	13	-27	-5	18	39
05	12	13	-11	26	.	-5	8	4	-29	6	24	31
06	18	11	-1	46	27	4	11	-15	-27	5	43	29
07	22	-6	11	55	15	9	4	-32	-23	21	42	30
08	17	-13	31	53	.	.	.	-53	-12	33	36	17
09	8	-13	46	46	-1	.	-31	-52	3	41	16	-11
10	4	-4	48	26	11	-28	.	-41	24	40	-11	-10
11	6	2	51	.	0	-43	-70	-32	41	23	-17	-15
12	13	12	32	-2	.	.	-78	-4	50	12	-12	-22
13	19	28	14	10	.	-41	-56	22	47	8	-38	-33
14	23	35	-4	.	.	-23	-49	.	30	0	.	-43
15	40	46	-10	1	.	3	-28	.	16	-24	.	-31
16	.	39	-18	-6	0	.	-3	58	5	-38	.	-9
17	38	20	-24	.	-3	31	18	37	1	.	.	5
18	41	6	-5	6	.	22	54	11	-29	.	.	13
19	31	6	-11	8	.	37	48	-9	-49	.	.	7
20	17	1	-12	.	18	22	24	-30	-75	-16	23	7
21	2	3	.	.	39	-1	.	-49	-79	0	21	5
22	-3	7	-7	.	10	-18	-23	-50	-59	24	16	4
23	-2	3	-4	-5	-4	-49	-49	-62	-37	51	6	-1
24	-6	-3	0	-1	-15	.	-69	.	-21	52	3	1
25	-1	-9	2	.	-17	.	-79	-13	-9	48	3	5
26	-3	-5	4	.	-36	.	-73	10	1	30	-7	18
27	-8	-5	7	.	-48	-34	-53	13	27	12	-13	.
28	.	-6	5	.	-33	.	-28	6	14	3	-6	.
29	-8	5	-2	-9	-15		.	13	-10	-5	14	41
30	3	6	-11	.	14		.	18	-20	-10	27	41
31		8		-20	10		.		-27		33	35

Dot symbol entry indicates no data available for the day.

SOLAR WIND

Interplanetary Scintillations

AUGUST 1978

DAY	3C48 VEL	3C48 ERR	3C144 VEL	3C144 ERR	3C147 VEL	3C147 ERR	3C161 VEL	3C161 ERR	3C237 VEL	3C237 ERR	3C273 VEL	3C273 ERR	3C298 VEL	3C298 ERR	3C459 VEL	3C459 ERR
1			232	8							368	9	264	37		
3			240	8			424	8			550	32	391	5		
4					347	13	435	59			429	48	480	10		
5	350	33	387	8	350	60					326	28	424	71		
6											412	16	339	32		
7	323	28									337	6				
8			430	11			327	21					319	33		
10			479	17	354	9	306	11					346	7		
11	368	6			288	8	274	8					367	6		
12	422	50	395	9	446	39	312	5			387	47	409	20		
13											338	14	336	19		
14	332	20	386	10			308	59			345	5	318	16		
15	369	64	373	12			384	6			304	29	368	5		
16			407	10							351	24	429	8		
17			379	11	271	15	361	12			416	7				
18	379	7	388	9	421	8	409	6					350	5		
19											333	53				
20	363	9	410	14	369	22	527	21					243	7		
21	331	17	417	*			362	*			318	6	274	6		
22	292	16	323	14	421	101	532	36			406	9	363	30		
23	464	113	372	21	273	59	457	18			322	*	294	8		
24			356	*	420	*	355	*			307	*	319	*		
25	359	46	285	7			302	5			424	15	315	5		
26			244	9	495	9	340	13			313	4	323	8		
27	425	36	399	9	316	4	370	10			274	3	406	4		
28			428	7	467	29	396	7			405	6	405	4		
29	434	5	398	8	355	6	389	36			407	12	504	16		
30	451	36	452	10			429	9			371	19	475	12		
30													464	23		
31	559	13	391	10			600	23					359	51		

AUGUST 5	UT	LAT	DIST	DLON
3C48	13.	12.	1.08	15.
3C144	17.	6.	0.76	41.
3C147	16.	27.	0.79	33.
3C161	18.	-21.	0.71	36.
3C237	22.	-13.	0.31	-70.
3C273	24.	6.	0.79	-38.
3C298	1.	10.	0.98	-17.
3C459	10.	8.	1.25	8.

15	UT	LAT	DIST	DLON
3C48	12.	12.	1.12	14.
3C144	16.	6.	0.86	31.
3C147	15.	21.	0.87	26.
3C161	17.	-14.	0.79	31.
3C237	21.	-25.	0.15	-77.
3C273	23.	7.	0.68	-47.
3C298	1.	12.	0.93	-21.
3C459	9.	8.	1.27	6.

25	UT	LAT	DIST	DLON
3C48	12.	12.	1.16	12.
3C144	15.	6.	0.93	21.
3C147	15.	17.	0.93	19.
3C161	17.	-9.	0.87	25.
3C237	20.	-62.	0.07	67.
3C273	22.	9.	0.55	-57.
3C298	0.	16.	0.86	-30.
3C459	9.	9.	1.29	4.

* Indicates data for which no error estimate is available since only two antennas were operating.

3C298 observed at 0 hr. UT before August 30 and at 24 hr. UT after August 30.

Dot symbol entry indicates no data available for the day.

BOULDER GEOMAGNETIC SUBSTORM LOG

AUGUST 1978

DATE	TIME OF ONSET	DIR.	COMMENTS
1			Quiet day
2			Quiet day
3			Mildly disturbed - no distinct onset
4	0250	East	
	0935	West	
5	0400	East	
	0640	East	
	0715	East	
	0835	East	
	1030	West	
6	0255	East	
	0555	West	
	0615	West	
	0640	West	
7	0740	West	
	1340		Oval stations only; Eskimo Pt. to Ft. Smith to Arctic Village
	1405		Oval stations only; Eskimo Pt. to Ft. Smith to Arctic Village
8	0235	East	Weak
	0700	≈center	Weak
	0735	≈center	Weak
	1115		Weak
	1420		Response NW Canada and Alaska
9	0425	East	Localized SS Lynn Lake eastward
	0900	West	
10	0745	West	
	1400		Confined to oval stations, Ft. Simpson westward
	1440		Confined to oval stations, Ft. Simpson westward
11	0510	East	Weak
	0530	East	Weak
	0610	East	Weak
	1350		Moderate
	1520		Moderate, slow onset
	1600		Moderate, slow onset
12	0520	East	Weak
	0555	East	Weak
	0650	Centered	Strong SS
	0935		
	1055		Moderate SS, strong Lynn Lake to Back
	1115		Moderate SS, strong Lynn Lake to Back
13	0225	East	
	0655	≈center	Weak
	1025	West	Moderate SS, strong at College
	1215	West	Weak
	1250	West	Moderate SS, strong at College
14	0500	East	
15			Quiet day
16			Quiet day
17	1045	West	Weak
	1110	West	Moderate
18	0010	East	Weak
	0340	East	Weak
	1210		Small H-component impulse at low latitude stations; network disturbed through 19/0235 with no distinct SS onsets
19	0820	West	1st of multiple onset SS
	0845	West	2nd of multiple onset SS
	0910	West	3rd of multiple onset SS
	1215		SS effect limited to Alaska
	1400		
20			Quiet day
21	0955	West	Weak; Lynn Lake to Norman Wells to Inuvik
	1520		Slow onset-decay; Norman Wells to Arctic Village to Cape Parry
	2100		Onset of unsettled period lasting through 22/0400 UT
22			Quiet day after 0400 UT
23			Quiet day
24	1125	West	Weak; oval stations only, Ft. Smith to College-Arctic Village
	1215	West	
25	0307		Weak positive impulse all mid and low latitude stations
	0650	West	Moderate
	0810	West	Weak
	0910	West	Weak
	1000	West	Moderate
	1205		Weak
	1310		Weak
26			Quiet day
27	0247		SSC - 40 gamma at Boulder; 34 gamma at Eusebio; 28 gamma at Wake; 23 gamma at Tahiti Mag storm follows
28			Major storm conditions near 06-17 UT
29			Mag storm through 1600 UT; significant SS listed
	0100	East	
	0350	East	
	0750	West	
	1035	West	
	1315		
30	0200	East	
	0355	East	
	0625	≈center	
	0955	West	Moderately strong SS vicinity College,
	1015		Weak SS at Island Lake
	1035	West	Onset of major SS at Ft. Smith with onset delayed westward - onset at College 1100 UT
	1330		
	1530		
	1925		
	2025		
31	0015	East	
	0045	East	
	0450	East	Weak
	0530	≈center	1st of double onset; SS center Lynn Lake
	0555	≈center	2nd of double onset; SS center Lynnn Lake
	0740	West	
	0830	West	Strong SS; center Ft. Smith
	1205	West	
	1405		1st of double onset
	1505		2nd of double onset

JULY 1978 DATA

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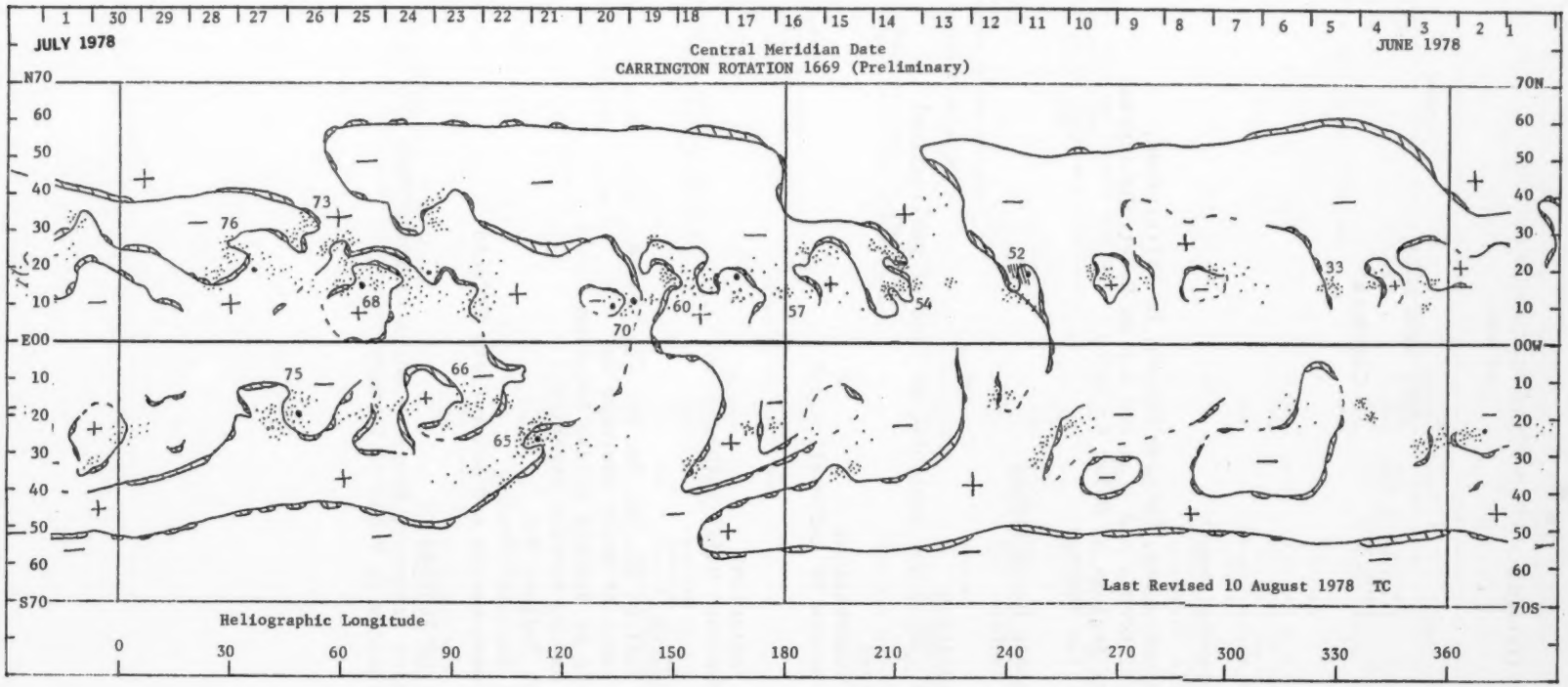
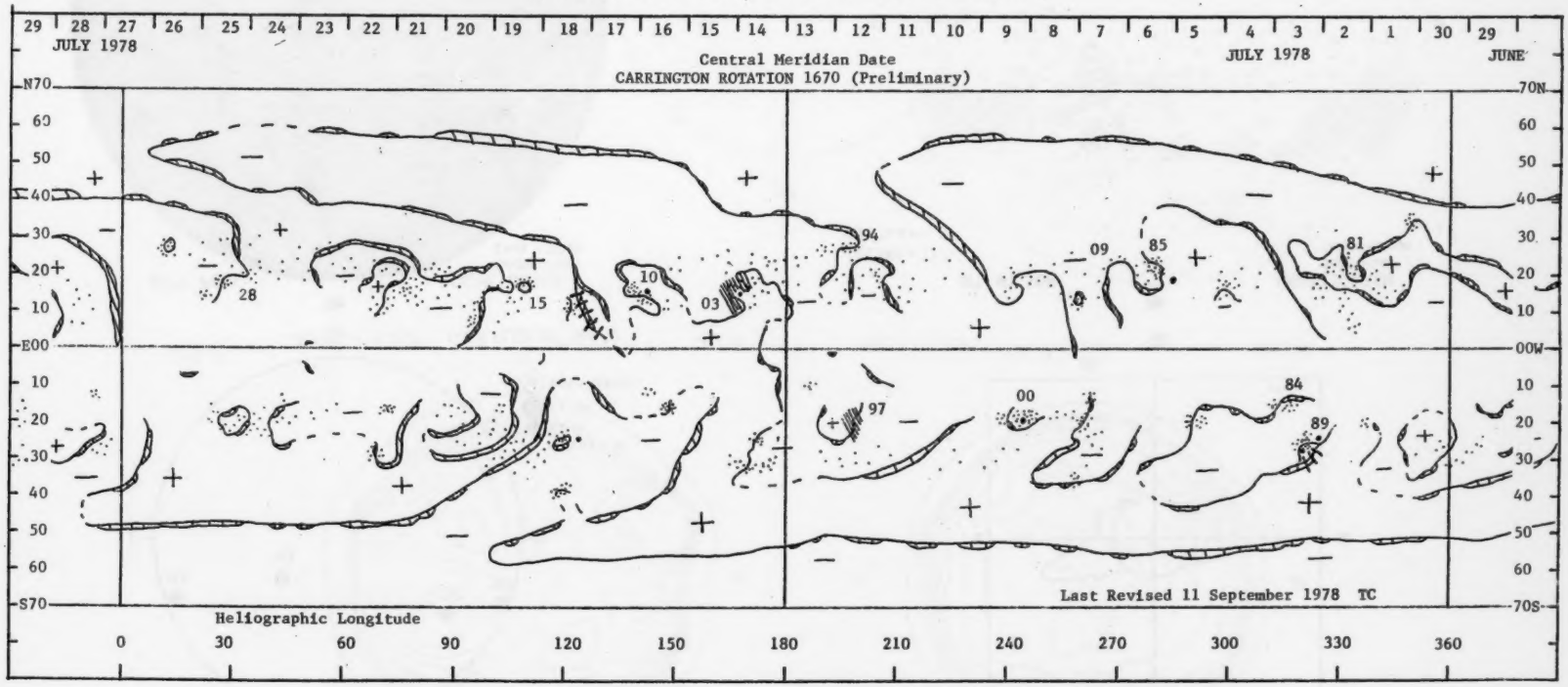
Hα SYNOPTIC CHART

CARRINGTON ROTATION 1669 (PRELIMINARY)



Hα SYNOPTIC CHART

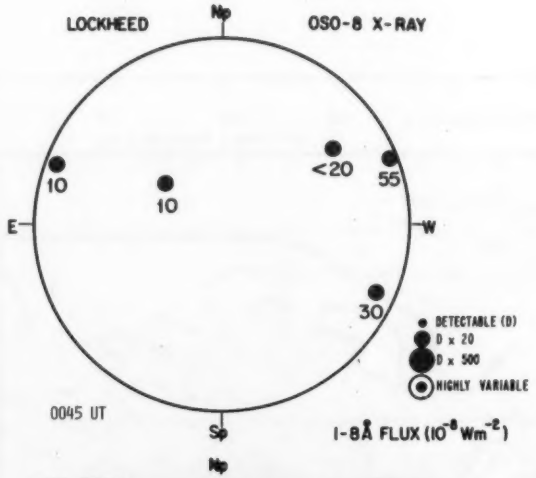
CARRINGTON ROTATION 1670 (PRELIMINARY)



37
Jul 78

JULY 1, 1978 (P=-2.86, B_o=2.87, L_o=351.55)

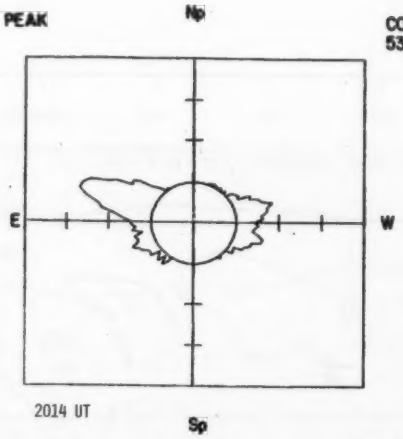
LOCKHEED OSO-8 X-RAY



0045 UT

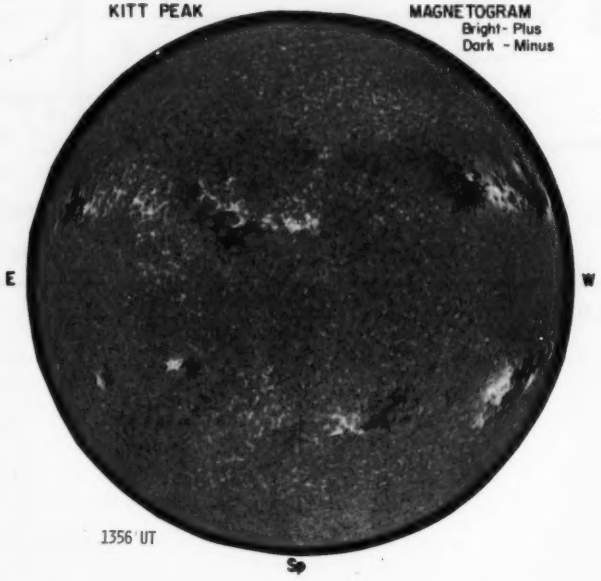
1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



2014 UT

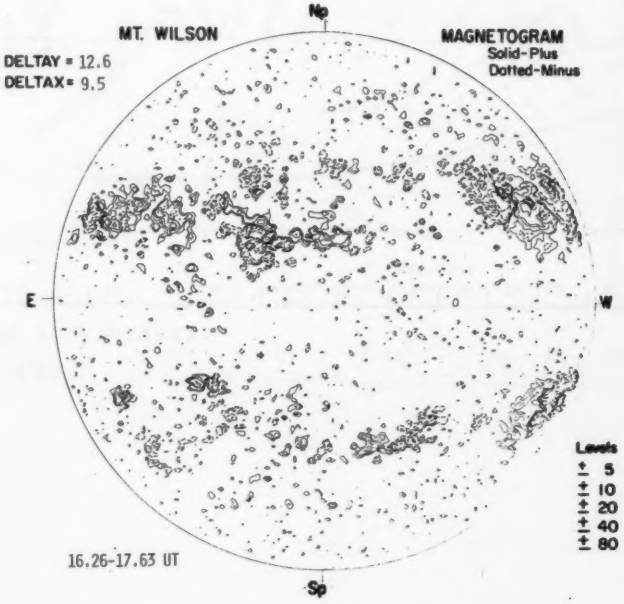
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1356 UT

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

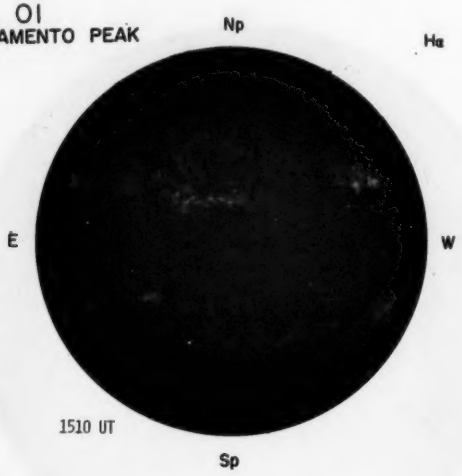
DELTAY = 12.6
DELTAX = 9.5



16.26-17.63 UT

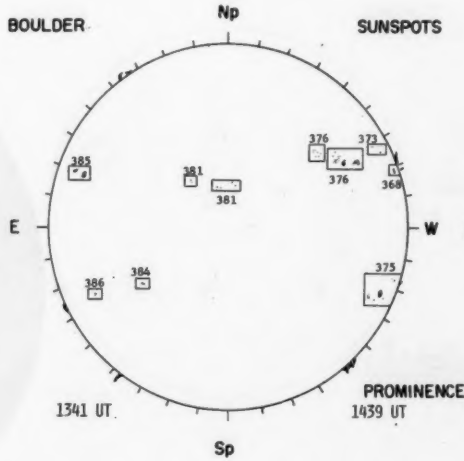
01

SACRAMENTO PEAK



1510 UT

Hα BOULDER



1341 UT

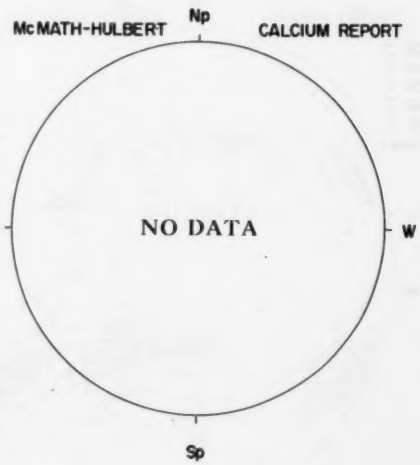
SUNSPOTS

PROMINENCES

1439 UT

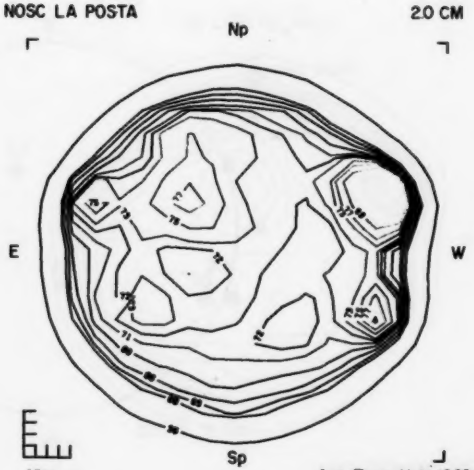
McMATH-HULBERT

CALCIUM REPORT



NOSC LA POSTA

2.0 CM

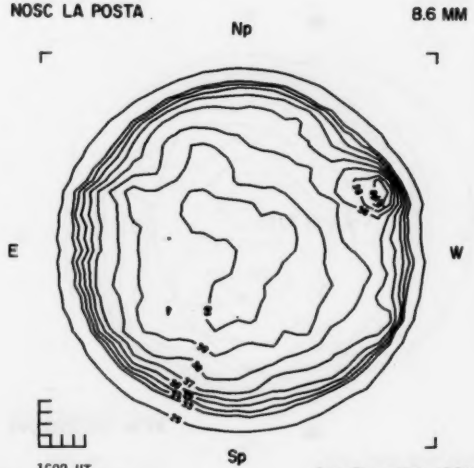


1711 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

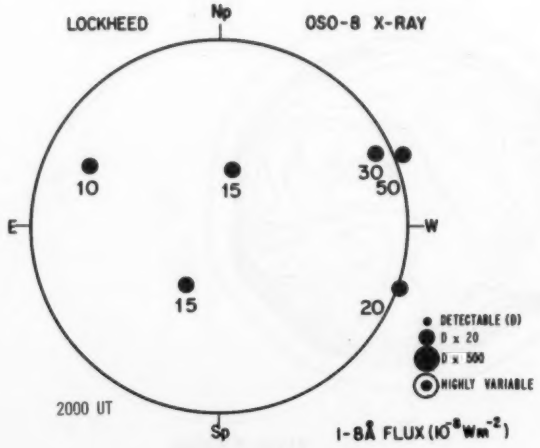


1602 UT

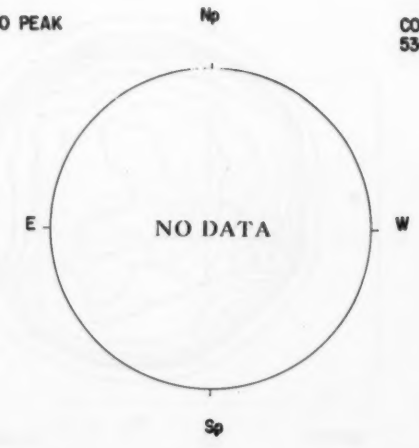
Ant. Temp. Unit 100°K

JULY 2, 1978 (P = -2.41, B_o = 2.98, L_o = 338.31)

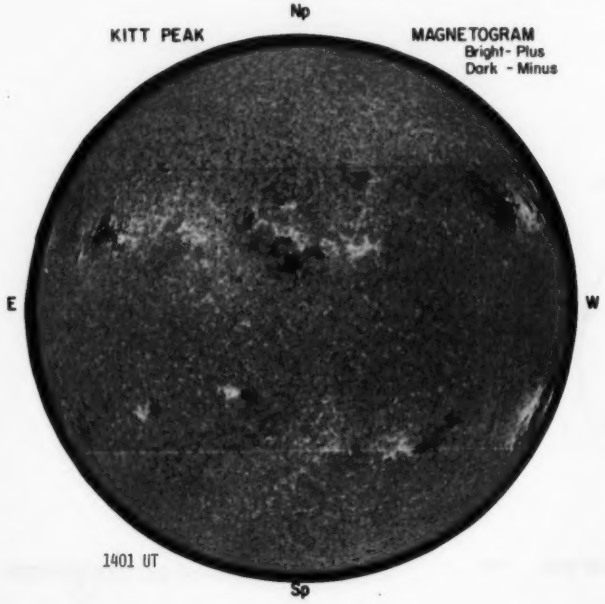
LOCKHEED OSO-8 X-RAY



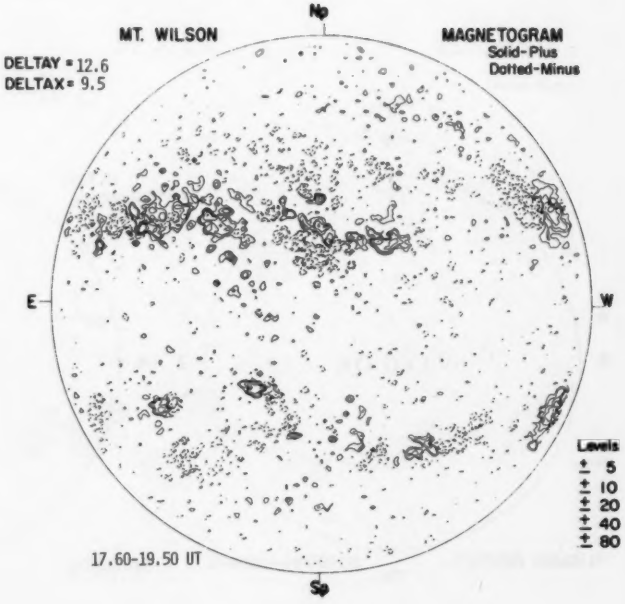
SACRAMENTO PEAK



KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus

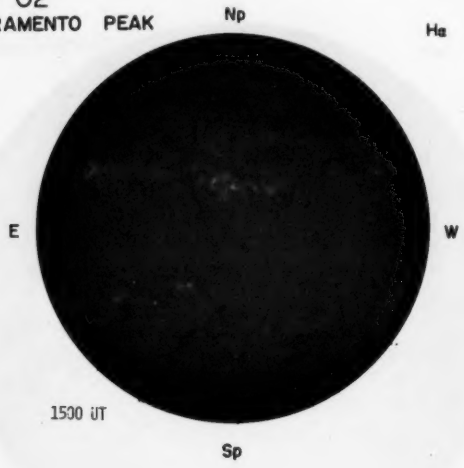


MT. WILSON MAGNETOGRAM
Solid-Plus
Dotted-Minus
DELTAY = 12.6
DELTAX = 9.5



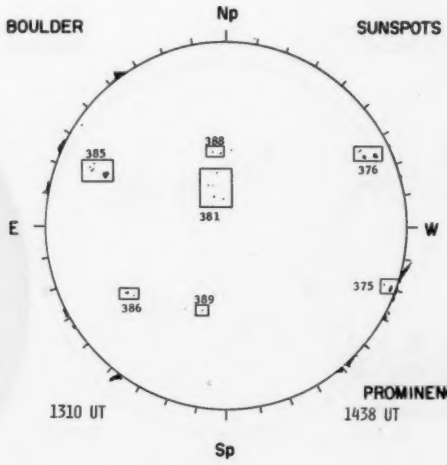
02

SACRAMENTO PEAK



1500 UT

Hα BOULDER



1310 UT

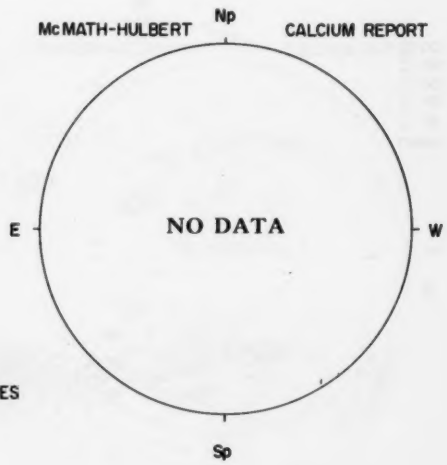
SUNSPOTS

PROMINENCES

1438 UT

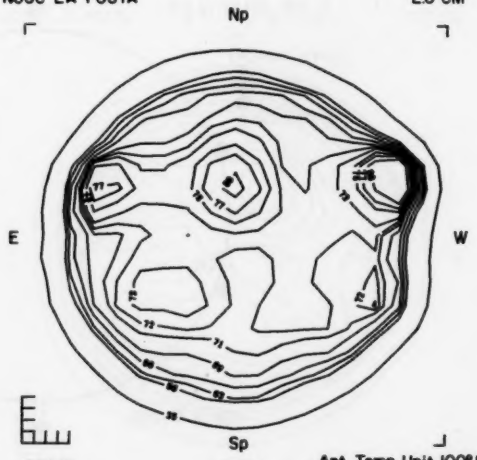
McMATH-HULBERT

CALCIUM REPORT



NOSC LA POSTA

2.0 CM

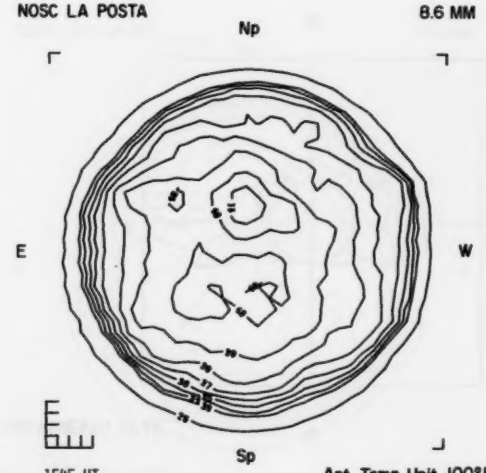


1646 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

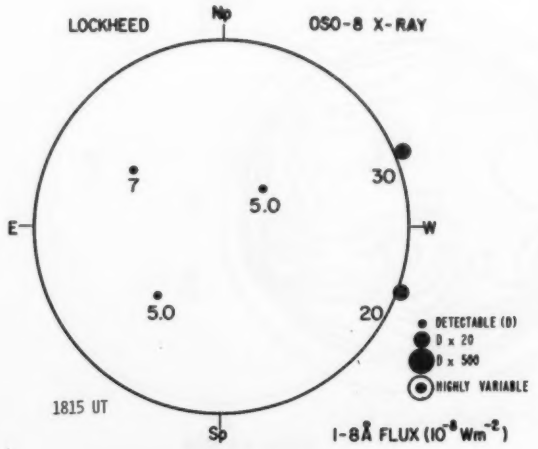


1545 UT

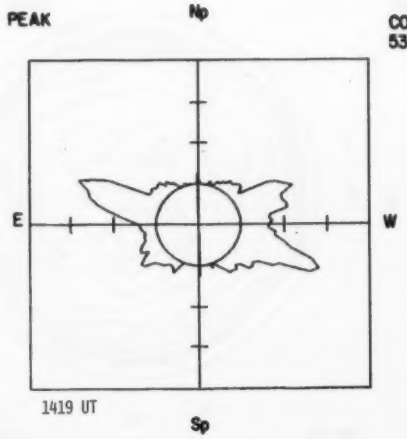
Ant. Temp. Unit 100°K

JULY 3, 1978 (P = -1.95, B_o = 3.09, L_o = 325.08)

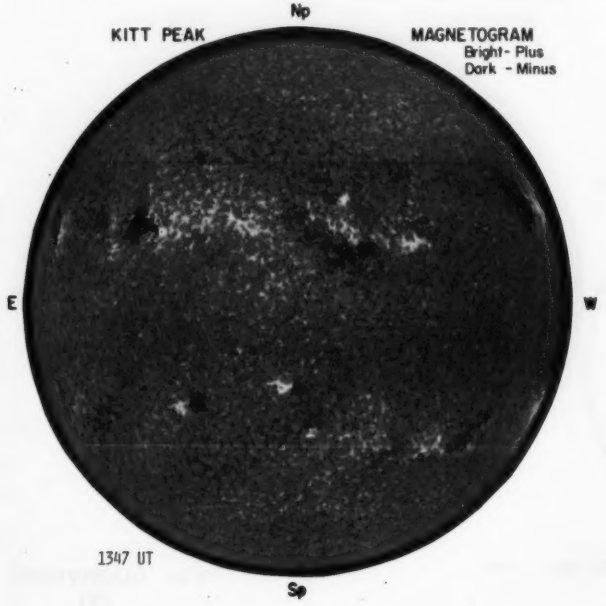
LOCKHEED OSO-8 X-RAY



SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

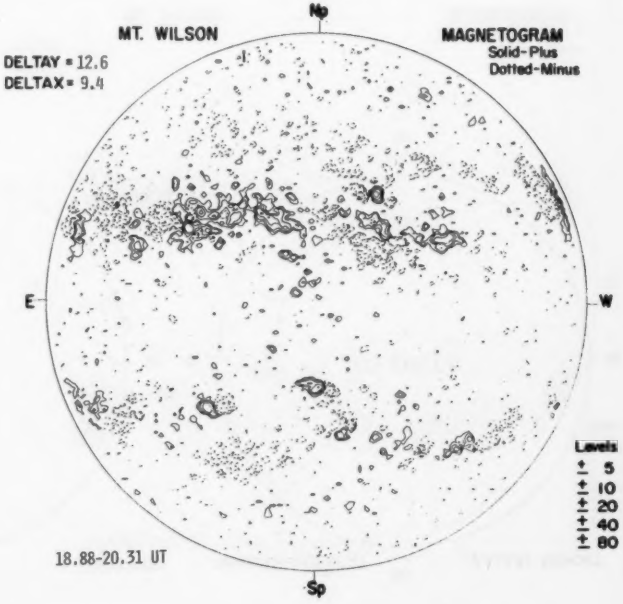


KITT PEAK MAGNETOGRAM Bright - Plus Dark - Minus



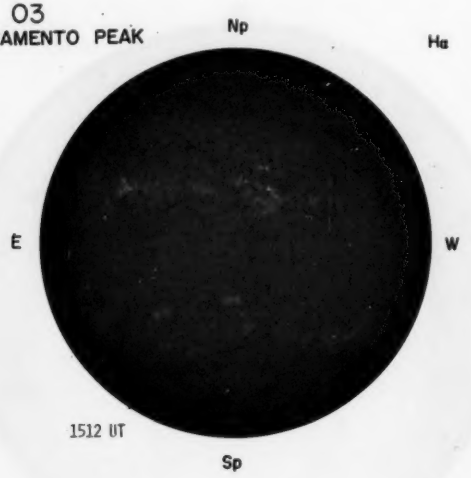
MT. WILSON MAGNETOGRAM Solid - Plus Dotted - Minus

DELTAY = 12.6
DELTAX = 9.4



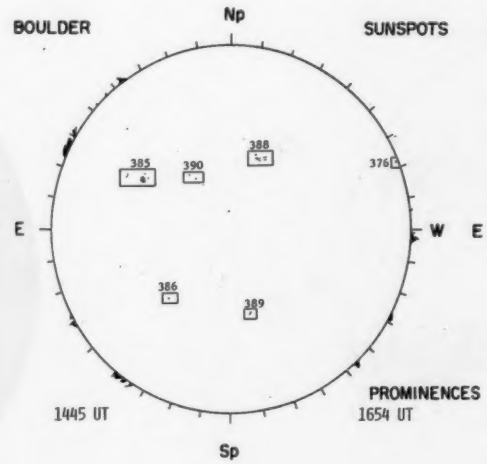
03

SACRAMENTO PEAK



1512 UT

Hα BOULDER



1445 UT

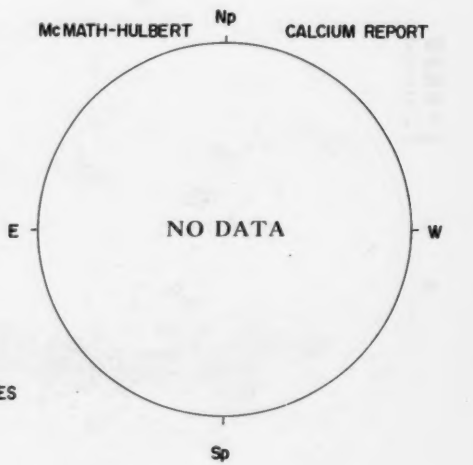
SUNSPOTS

PROMINENCES

1654 UT

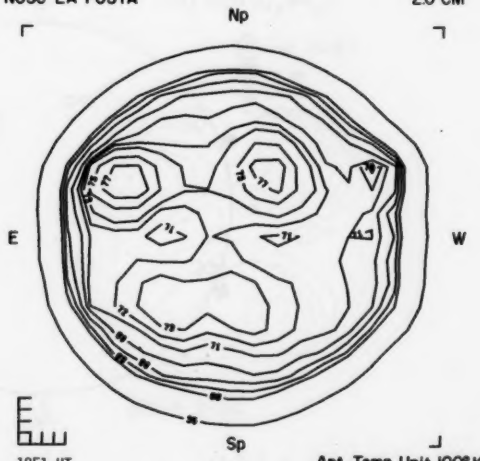
McMATH-HULBERT

CALCIUM REPORT



NOSC LA POSTA

2.0 CM

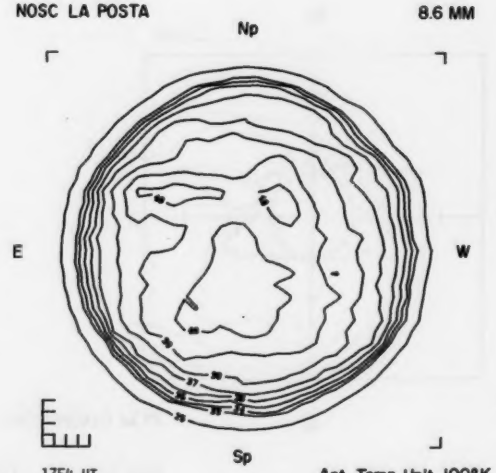


1851 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

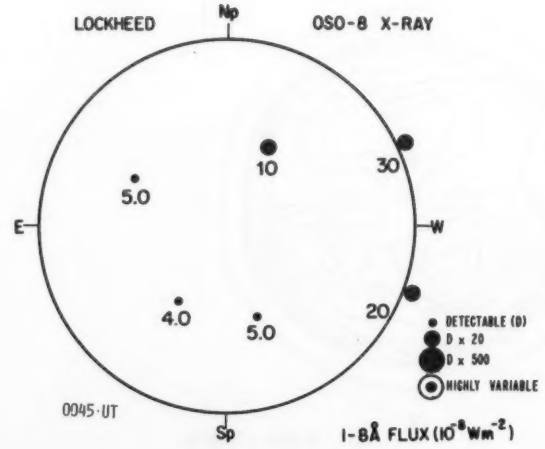
8.6 MM

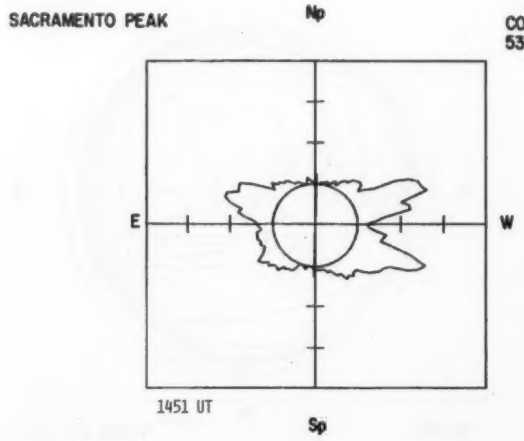


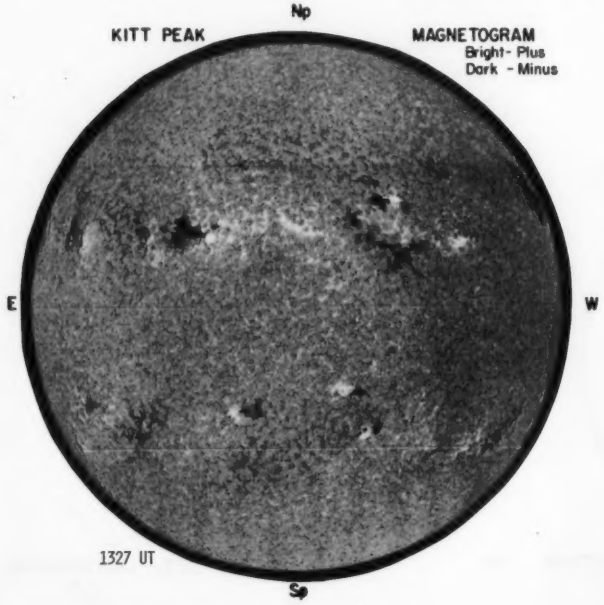
1754 UT

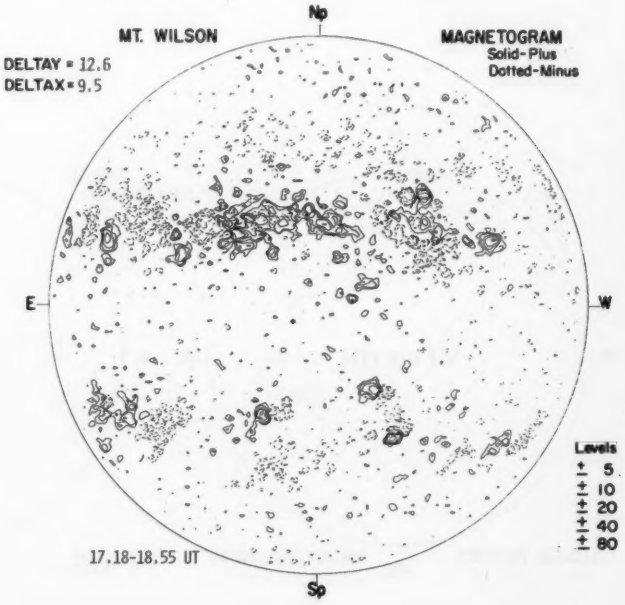
Ant. Temp. Unit 100°K

JULY 4, 1978 (P = -1.50, B_o = 3.20, L_o = 311.84)



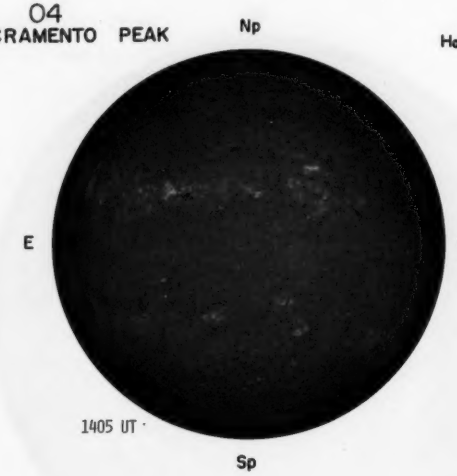






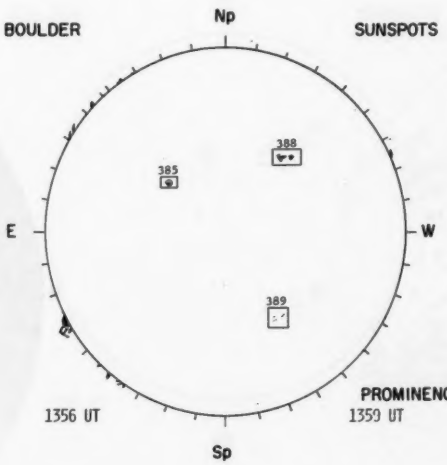
04

SACRAMENTO PEAK



1405 UT

Hα BOULDER



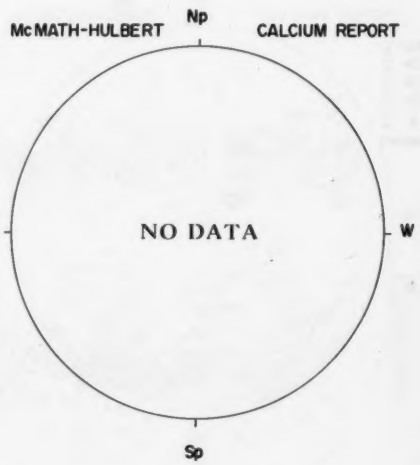
1356 UT

SUNSPOTS

PROMINENCES

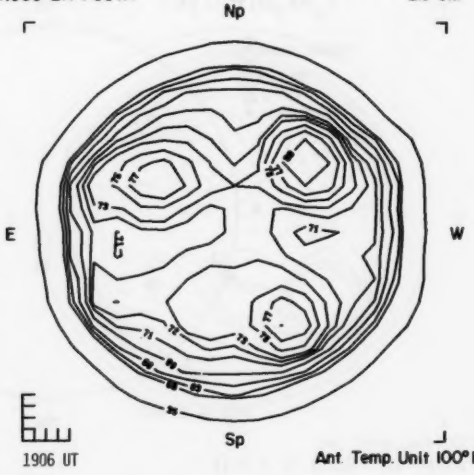
1359 UT

McMATH-HULBERT



CALCIUM REPORT

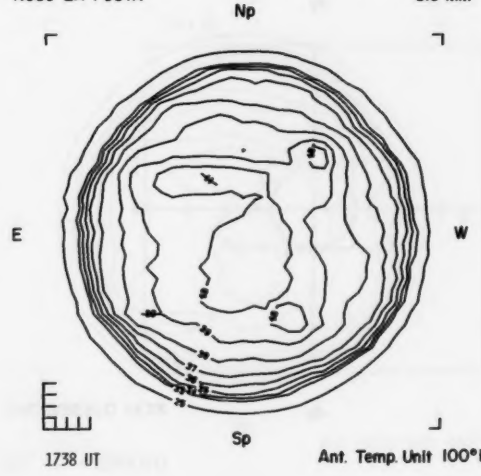
NOSC LA POSTA 2.0 CM



1906 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM

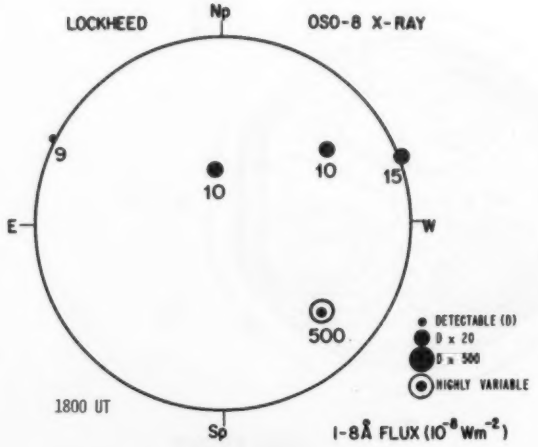


1738 UT

Ant. Temp. Unit 100°K

JULY 5, 1978 (P = -1.04, B_0 = 3.30, L_0 = 298.61)

LOCKHEED OSO-8 X-RAY

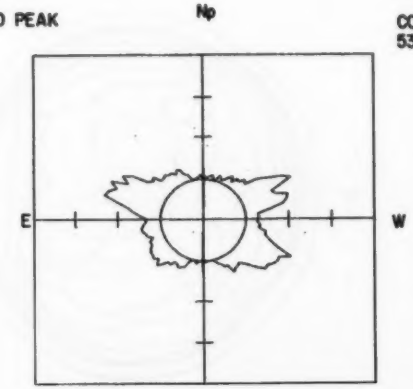


1800 UT

1-8Å FLUX (10^{-6} Wm^{-2})

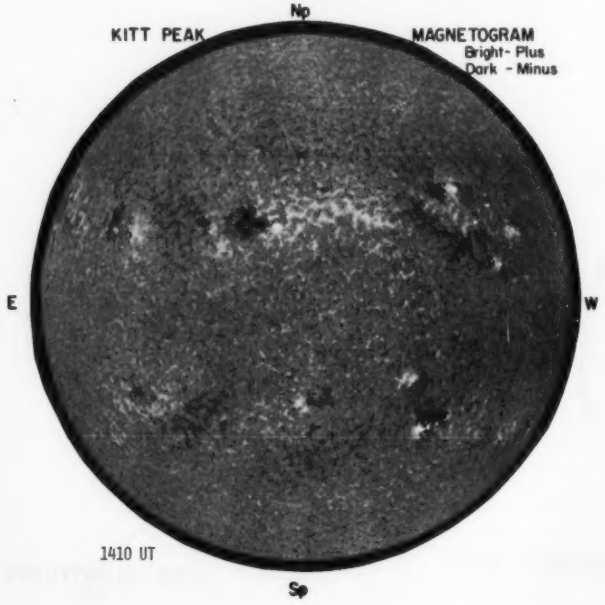
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



1447 UT

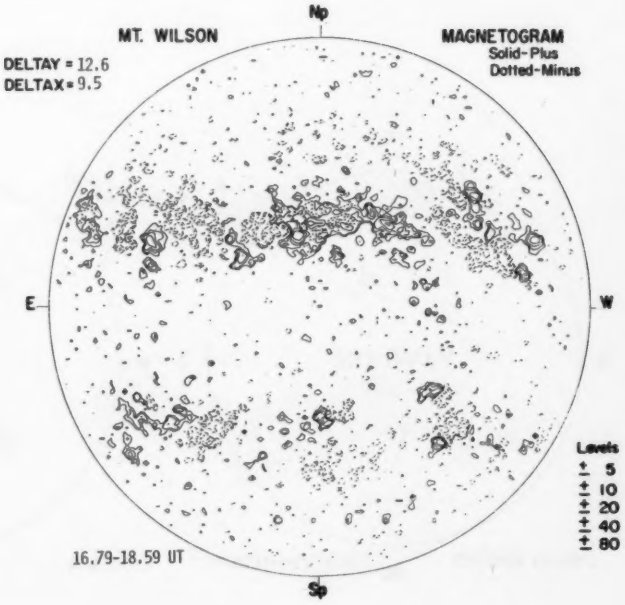
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1410 UT

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY = 12.6
DELTAX = 9.5



16.79-18.59 UT

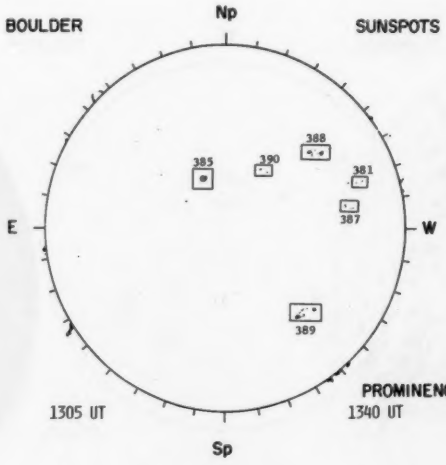
05

SACRAMENTO PEAK

1407 UT

Hα

BOULDER



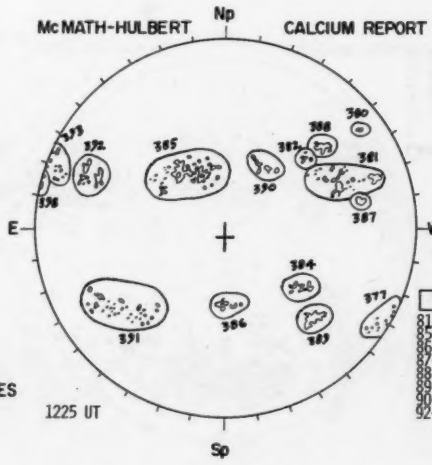
1305 UT

SUNSPOTS

PROMINENCES

1340 UT

McMATH-HULBERT



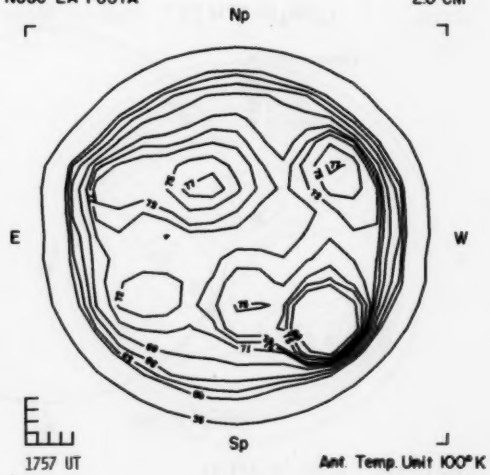
1225 UT

CALCIUM REPORT

FAIR	S
81- 2400	2.5
85- 3000	5.0
86- 0400	2.5
87- 0400	5.0
88- 0700	3.5
89- 1100	4.5
90- 0500	2.5
92- 1200	2.5

NOSC LA POSTA

2.0 CM

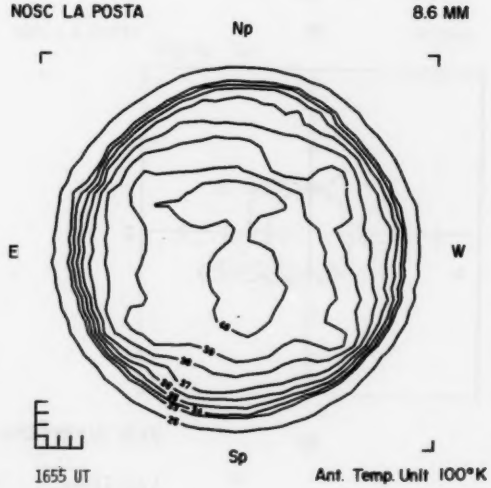


1757 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM



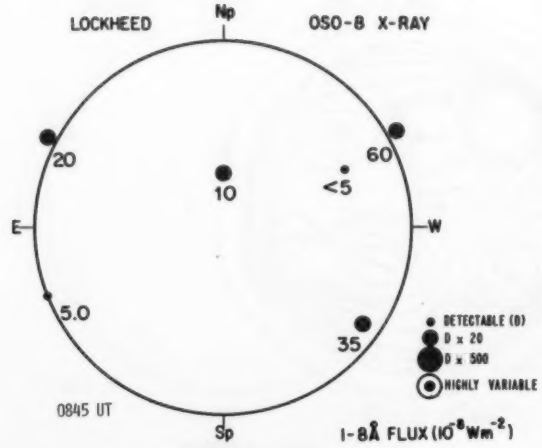
1655 UT

Ant. Temp. Unit 100°K

47
Jul 78

JULY 6, 1978 (P=-0.59, B_o=3.41, L_o=285.37)

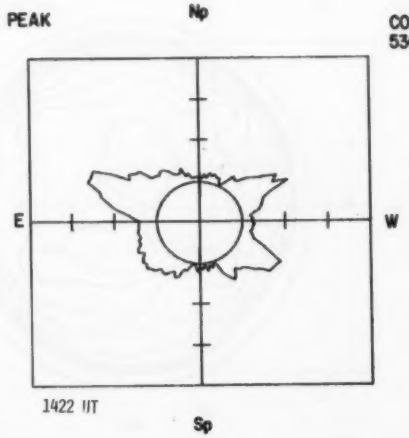
LOCKHEED OSO-8 X-RAY



0845 UT

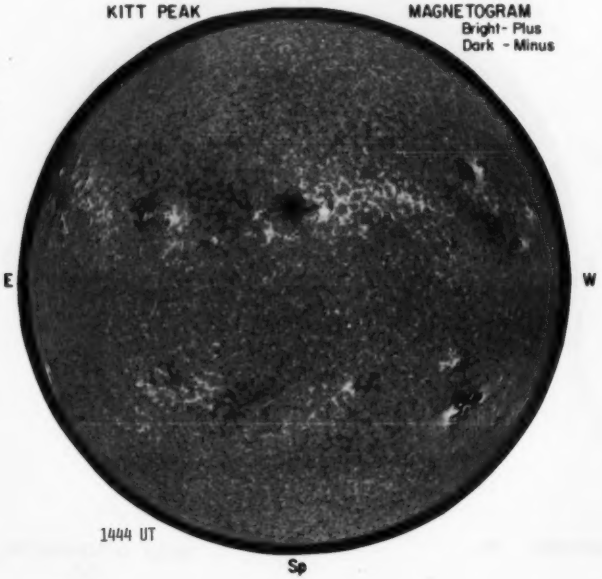
1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK



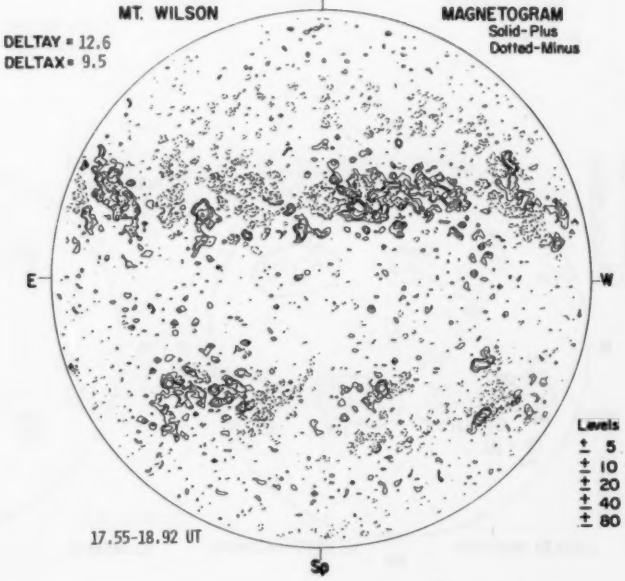
1422 UT

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1444 UT

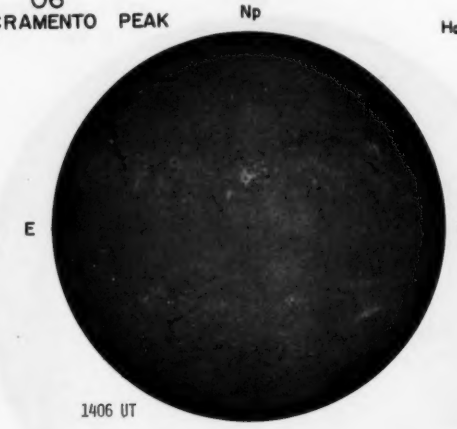
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY = 12.6
DELTAX = 9.5



17.55-18.92 UT

06

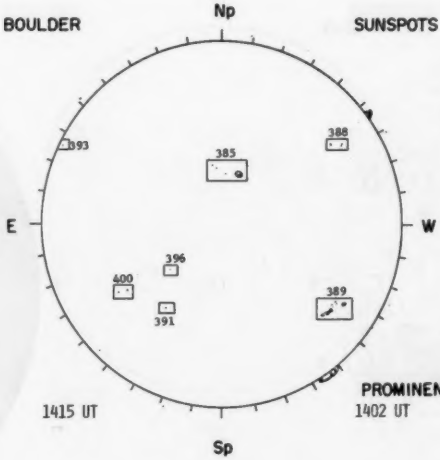
SACRAMENTO PEAK



1406 UT

Hα

BOULDER



1415 UT

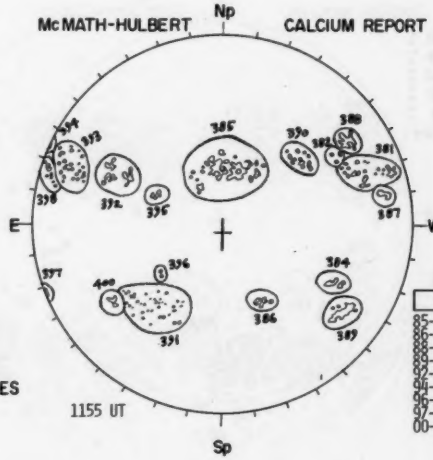
SUNSPOTS

PROMINENCES

1402 UT

McMATH-HULBERT

CALCULUM REPORT

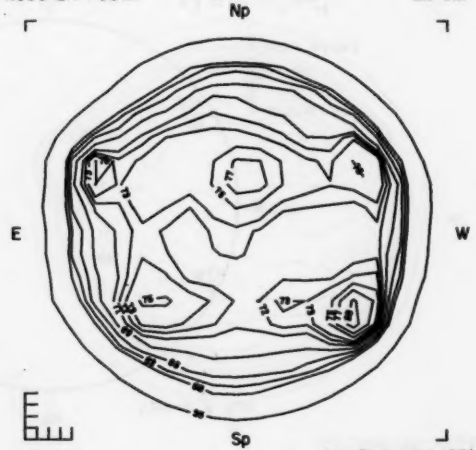


1155 UT

GOOD	M
85- 2700-3.0	
86- 0300-2.5	
86- 0700-3.0	
88- 1200-3.5	
92- 1200-2.5	
94- 0600-3.0	
96- 0100-2.5	
97- 0200-3.0	
00- 0300-2.5	

NOSC LA POSTA

2.0 CM



1745 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

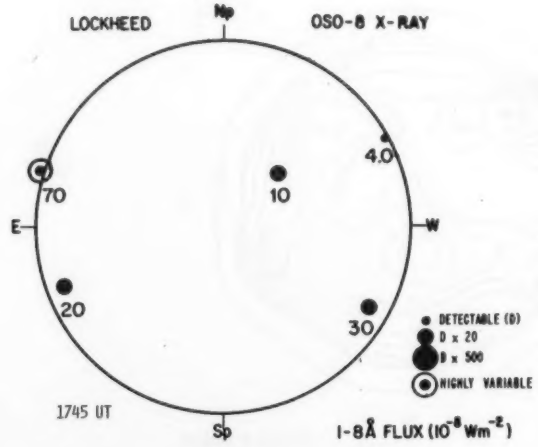
8.6 MM

1647 UT

Ant. Temp. Unit 100°K

JULY 7, 1978 (P = -0.13, B_0 = 3.52, L_0 = 272.14)

LOCKHEED OSO-8 X-RAY

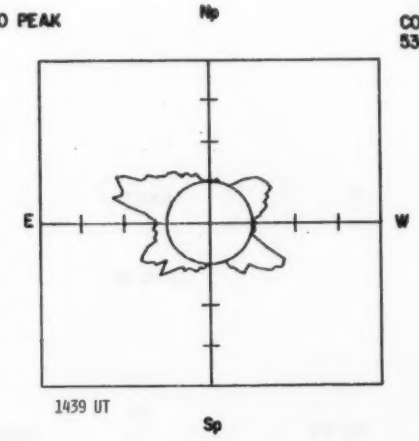


DETECTABLE (D)
D x 20
D x 500
HIGHLY VARIABLE

1745 UT

1-8Å FLUX (10^{-8} Wm^{-2})

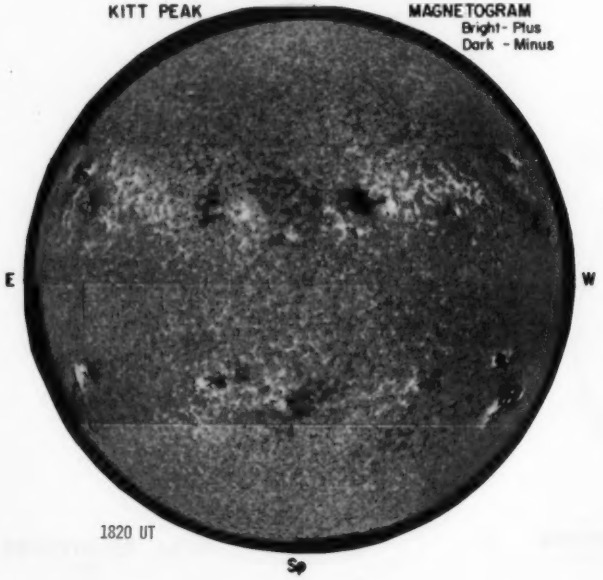
SACRAMENTO PEAK



CORONA (1.15 $R_\odot$)
5303 Å

1439 UT

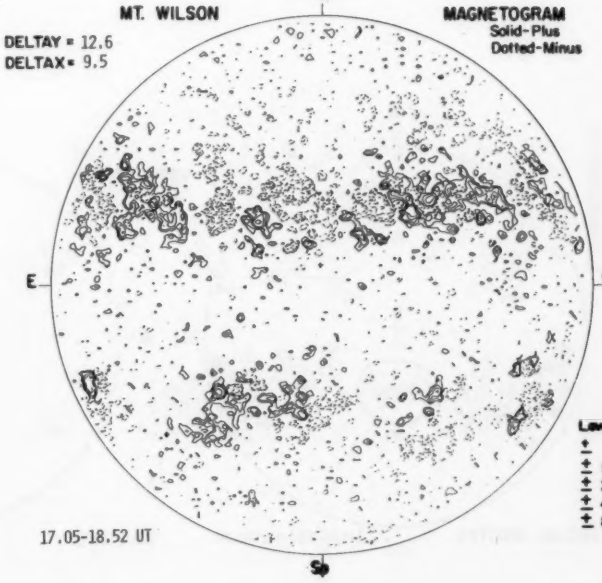
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1820 UT

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

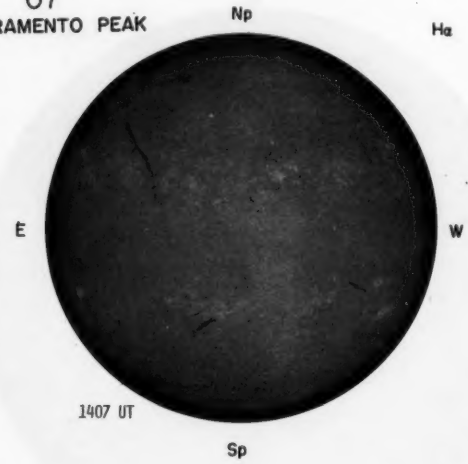
DELTAY = 12.6
DELTAX = 9.5



17.05-18.52 UT

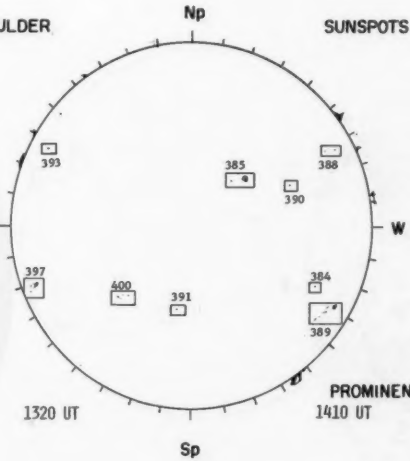
07

SACRAMENTO PEAK



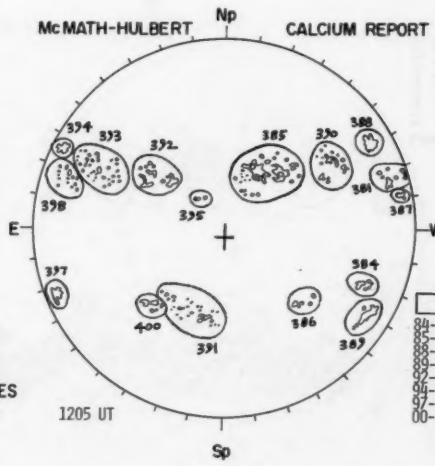
Hα

BOULDER



SUNSPOTS

McMATH-HULBERT



CALCIUM REPORT

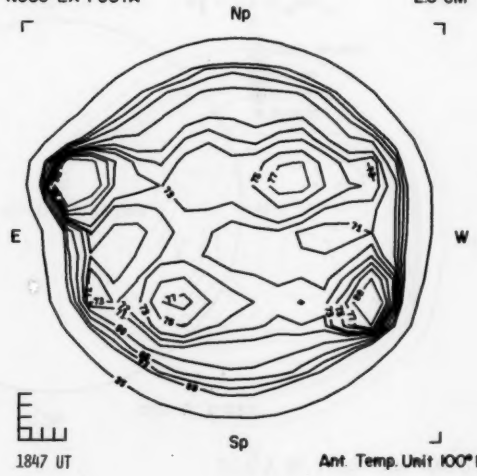
GOOD	M
84- 0600-3.0	
85- 2400-2.5	
88- 0900-2.5	
89- 1200-3.5	
92- 1000-2.5	
94- 1000-3.0	
97- 1200-3.5	
00- 0800-2.5	

PROMINENCES

1410 UT

NOSC LA POSTA

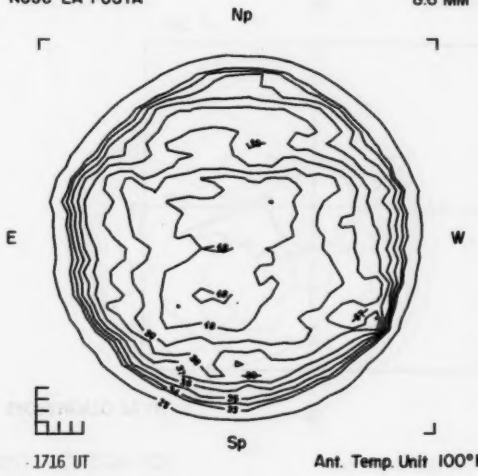
2.0 CM



Ant. Temp. Unit 100°K

NOSC LA POSTA

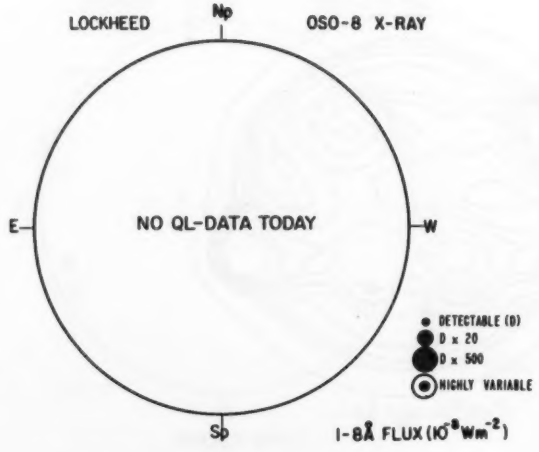
8.6 MM



Ant. Temp. Unit 100°K

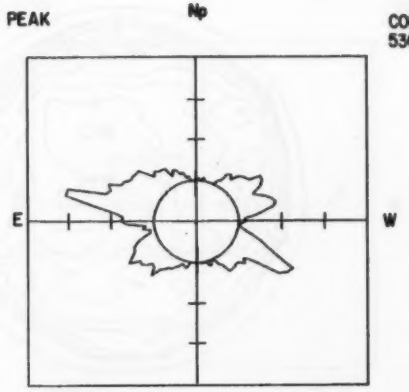
JULY 8, 1978 (P = 0.32; B_0 = 3.62, L_0 = 258.90)

LOCKHEED OSO-8 X-RAY



I-8Å FLUX (10^{-8} Wm^{-2})

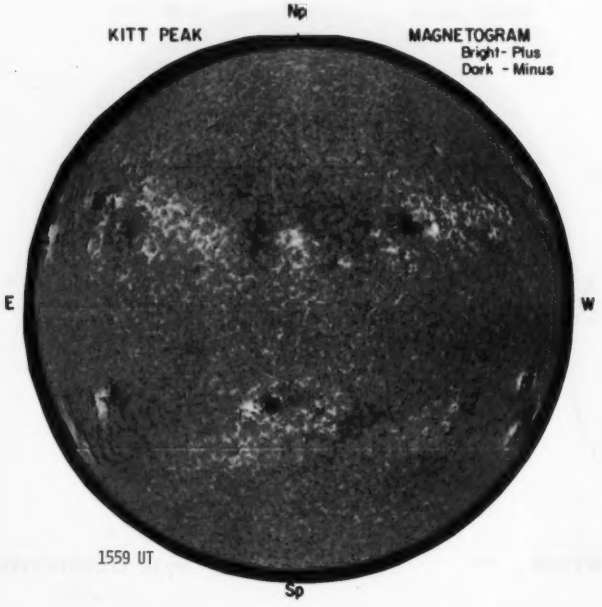
SACRAMENTO PEAK



CORONA (1.15 $R_\odot$)
5303 Å

1457 UT

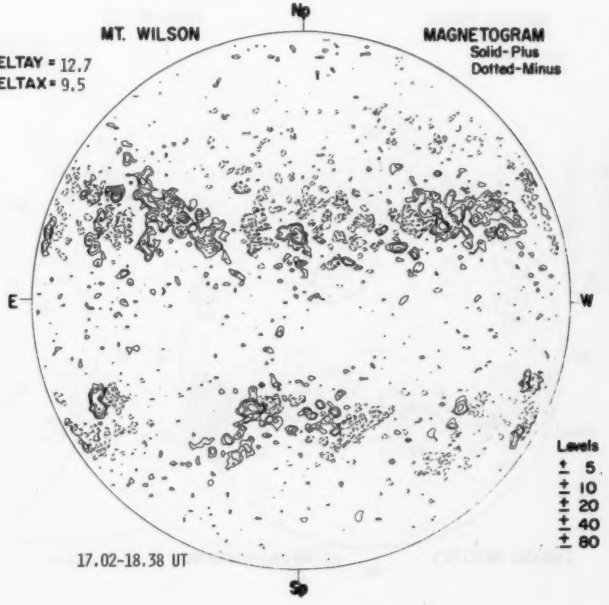
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1559 UT

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

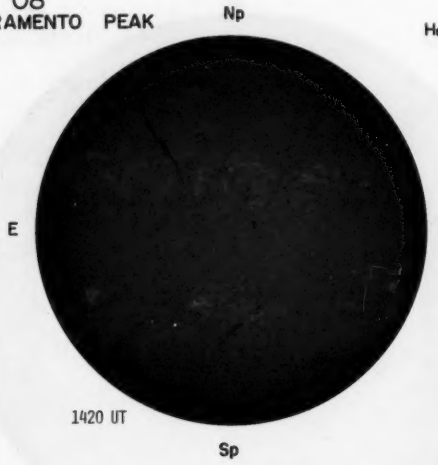
DELTAY = 12.7
DELTAX = 9.5



17.02-18.38 UT

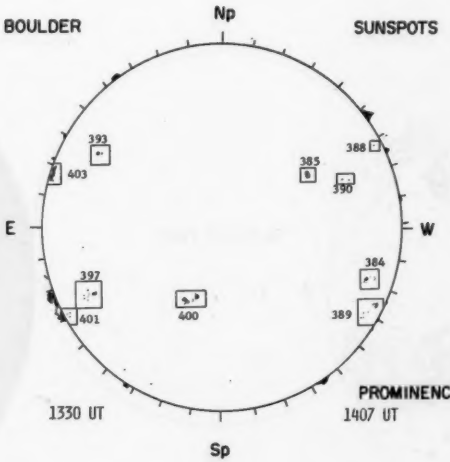
08

SACRAMENTO PEAK



1420 UT

Hα BOULDER



1330 UT

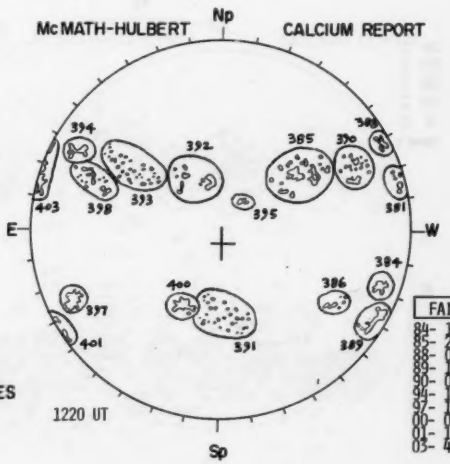
SUNSPOTS

PROMINENCES

1407 UT

McMATH-HULBERT

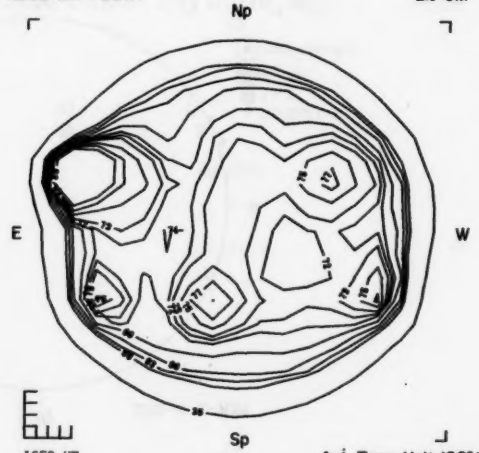
CALCIUM REPORT



1220 UT

FAIR	M
84- 1000-	3.5
85- 2400-	2.5
88- 0900-	2.5
89- 1800-	3.5
90- 0700-	2.5
94- 1100-	3.0
97- 1500-	3.5
00- 0900-	3.0
01- 1500-	2.5
03- 4500-	3.0

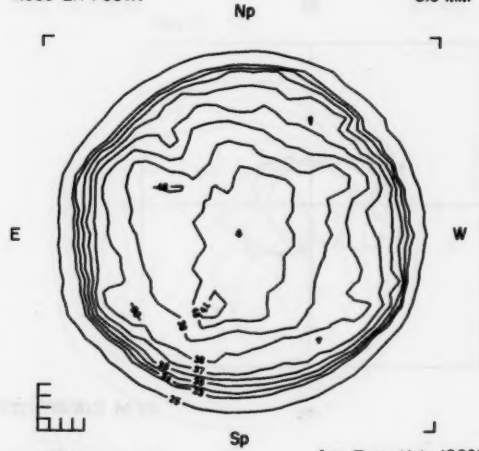
NOSC LA POSTA 2.0 CM



1659 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM

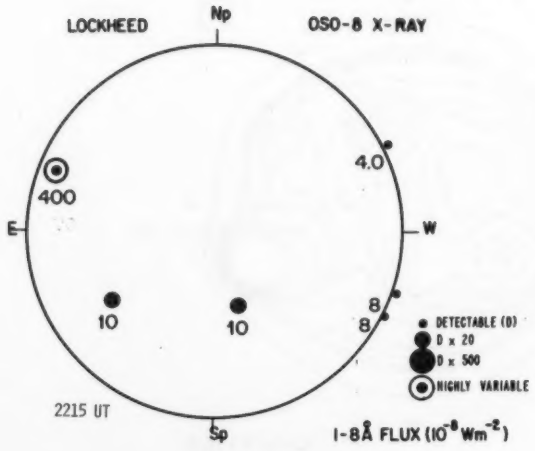


1547 UT

Ant. Temp. Unit 100°K

JULY 9, 1978 (P = 0.77, B_0 = 3.73, L_0 = 245.67)

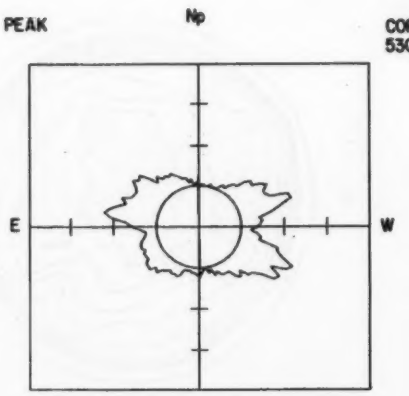
LOCKHEED OSO-8 X-RAY



2215 UT

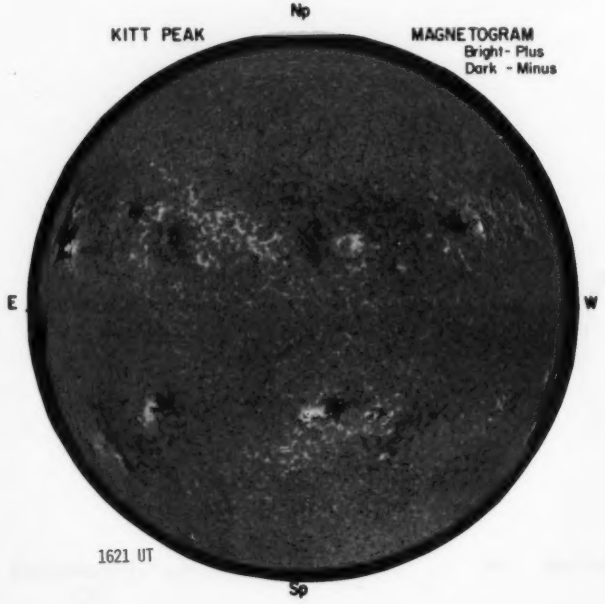
1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



1437 UT

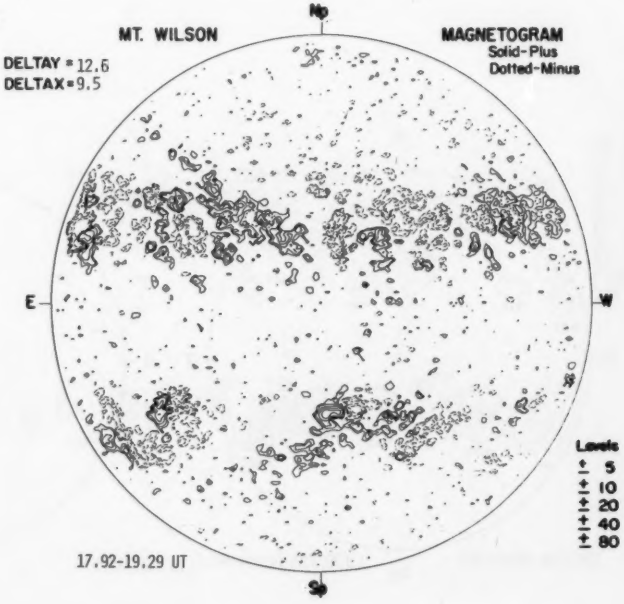
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1621 UT

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY = 12.6
DELTAX = 9.5

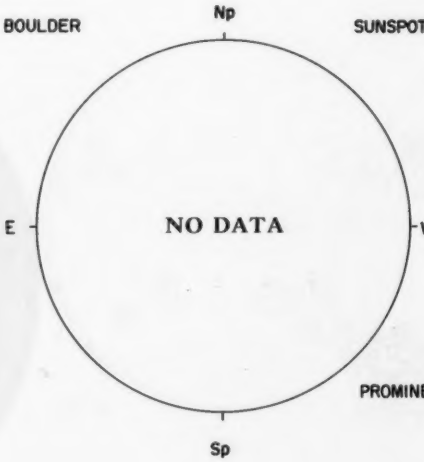


17.92-19.29 UT

09

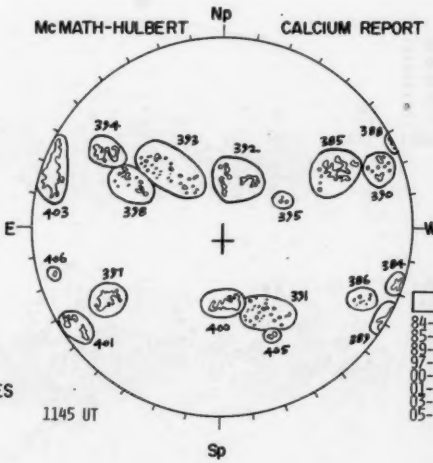
SACRAMENTO PEAK

Hα BOULDER



SUNSPOTS

McMATH-HULBERT



CALCIUM REPORT

FAIR	M
84- 1000-2.5	
85- 1700-2.5	
86- 1800-2.5	
87- 1600-3.0	
00- 1000-3.0	
01- 1400-3.0	
03- 4800-4.0	
05- 0200-2.5	

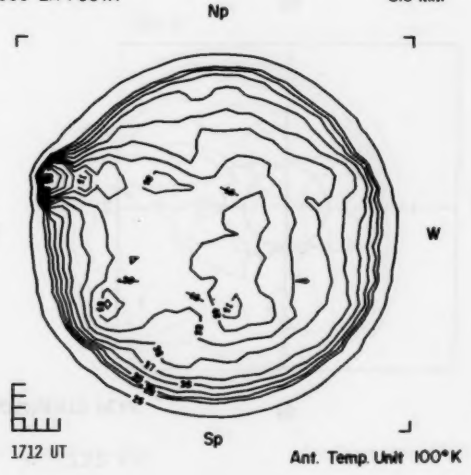
PROMINENCES

NOSC LA POSTA

2.0 CM

NOSC LA POSTA

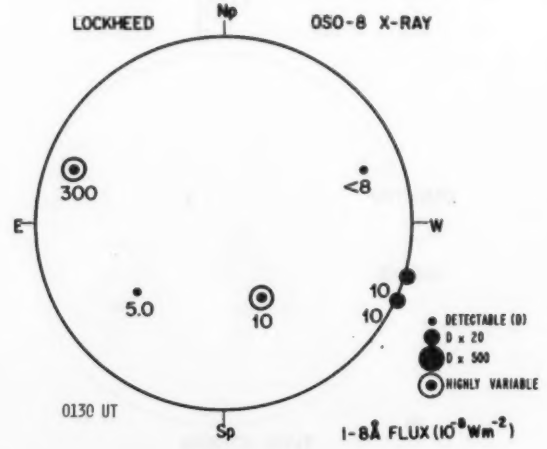
8.6 MM



55
Jul 78

JULY 10, 1978 (P = 1.23, B_o = 3.83, L_o = 232.43)

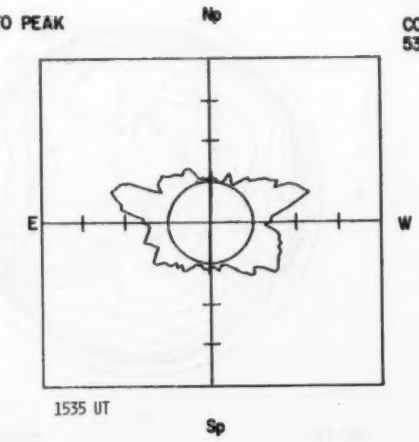
LOCKHEED — OSO-8 X-RAY



0130 UT

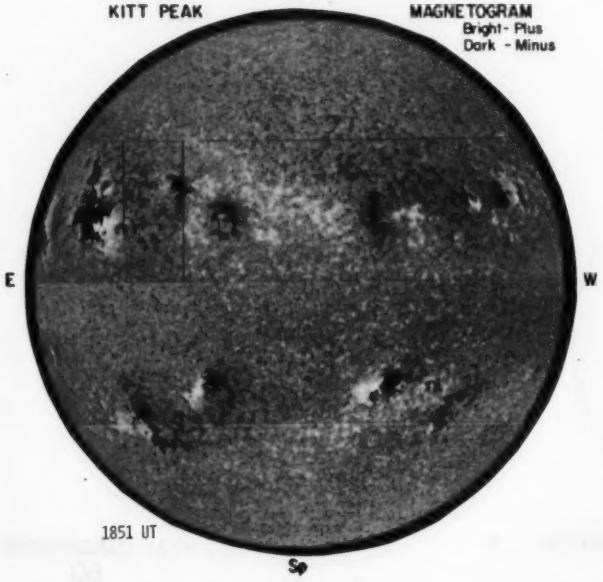
1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK — CORONA (1.15 $R_\odot$) 5303 Å



1535 UT

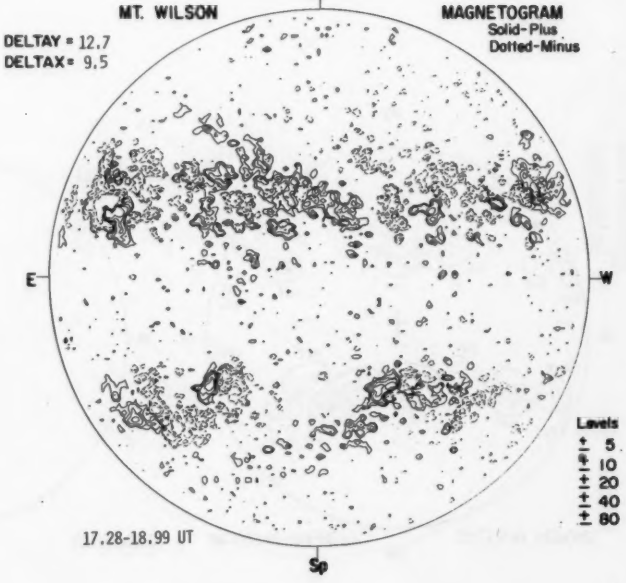
KITT PEAK — MAGNETOGRAM
Bright - Plus
Dark - Minus



1851 UT

MT. WILSON — MAGNETOGRAM
Solid - Plus
Dotted - Minus

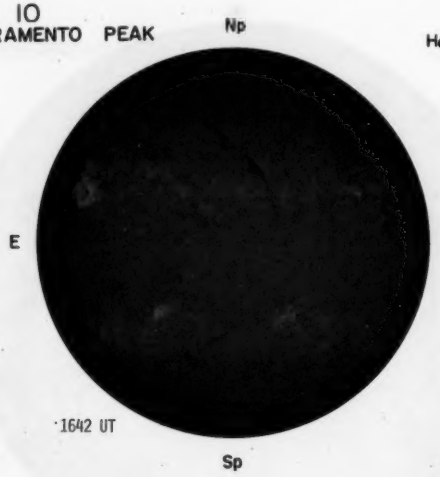
DELTAY = 12.7
DELTAX = 9.5



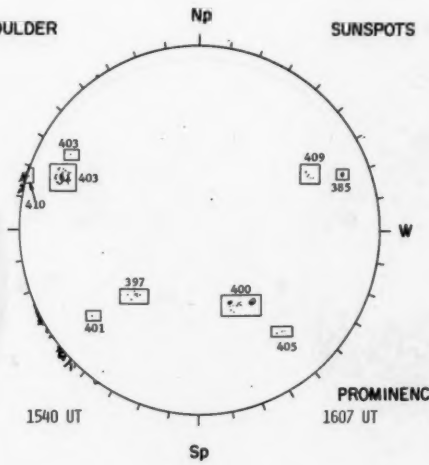
17.28-18.99 UT

10

SACRAMENTO PEAK



Hα BOULDER



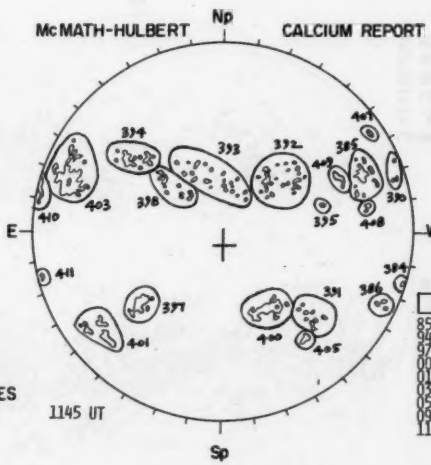
SUNSPOTS

PROMINENCES

1607 UT

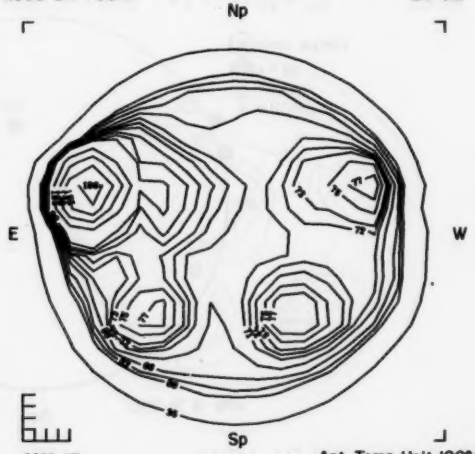
McMATH-HULBERT

CALCIUM REPORT

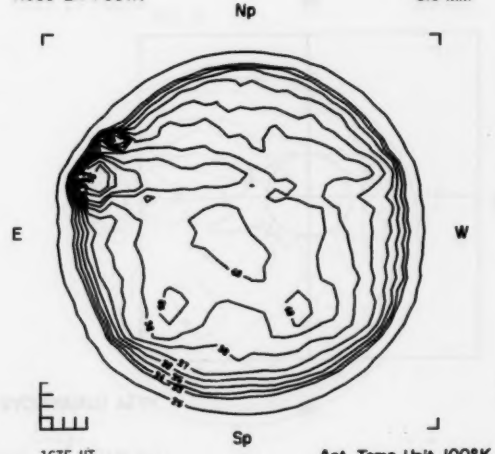


FAIR	D
85- 1600	2.5
94- 1100	2.5
97- 1500	3.5
00- 1300	2.5
01- 1500	2.5
02- 5000	4.0
05- 0300	2.5
09- 0400	2.5
11- 0300	2.5

NOSC LA POSTA 2.0 CM

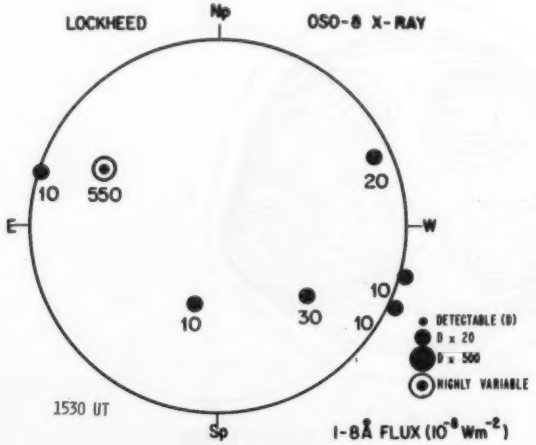


NOSC LA POSTA 8.6 MM



JULY 11, 1978 (P=1.68, B_o = 3.93, L_o = 219.20)

LOCKHEED OSO-8 X-RAY

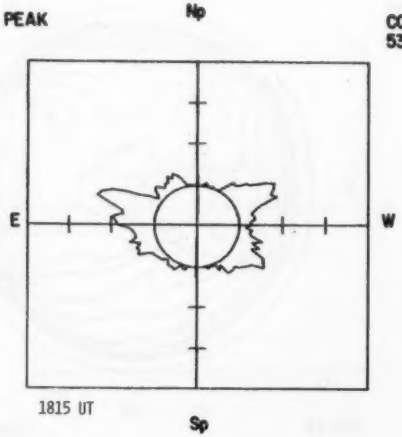


1530 UT

1-8Å FLUX (10^{-8} Wm^{-2})

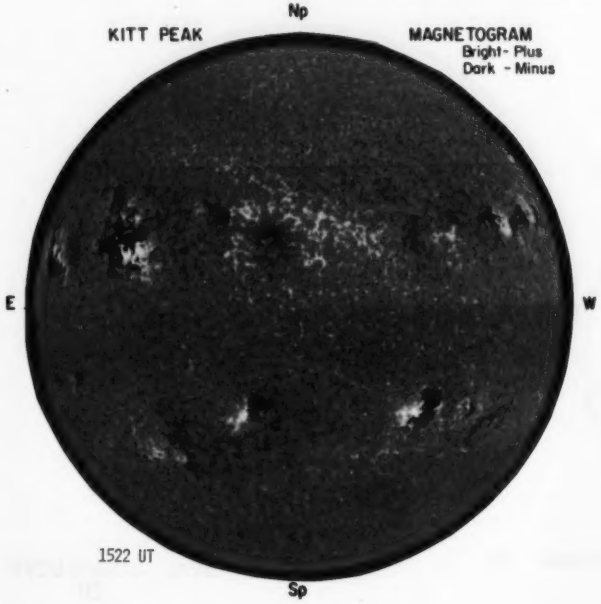
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



1815 UT

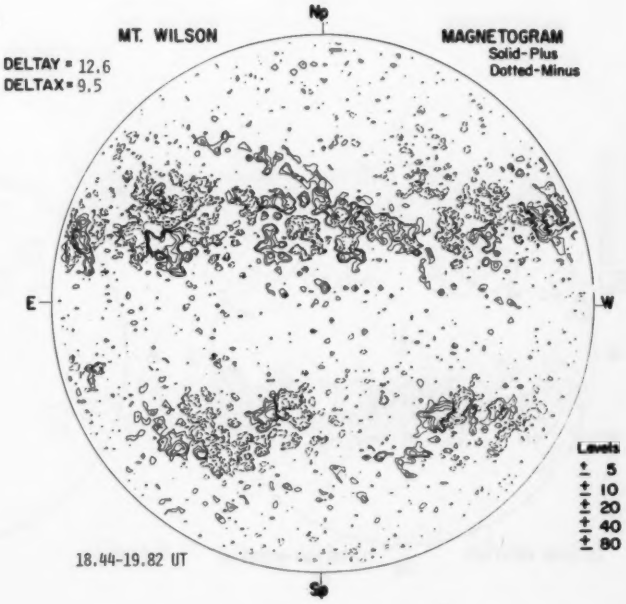
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



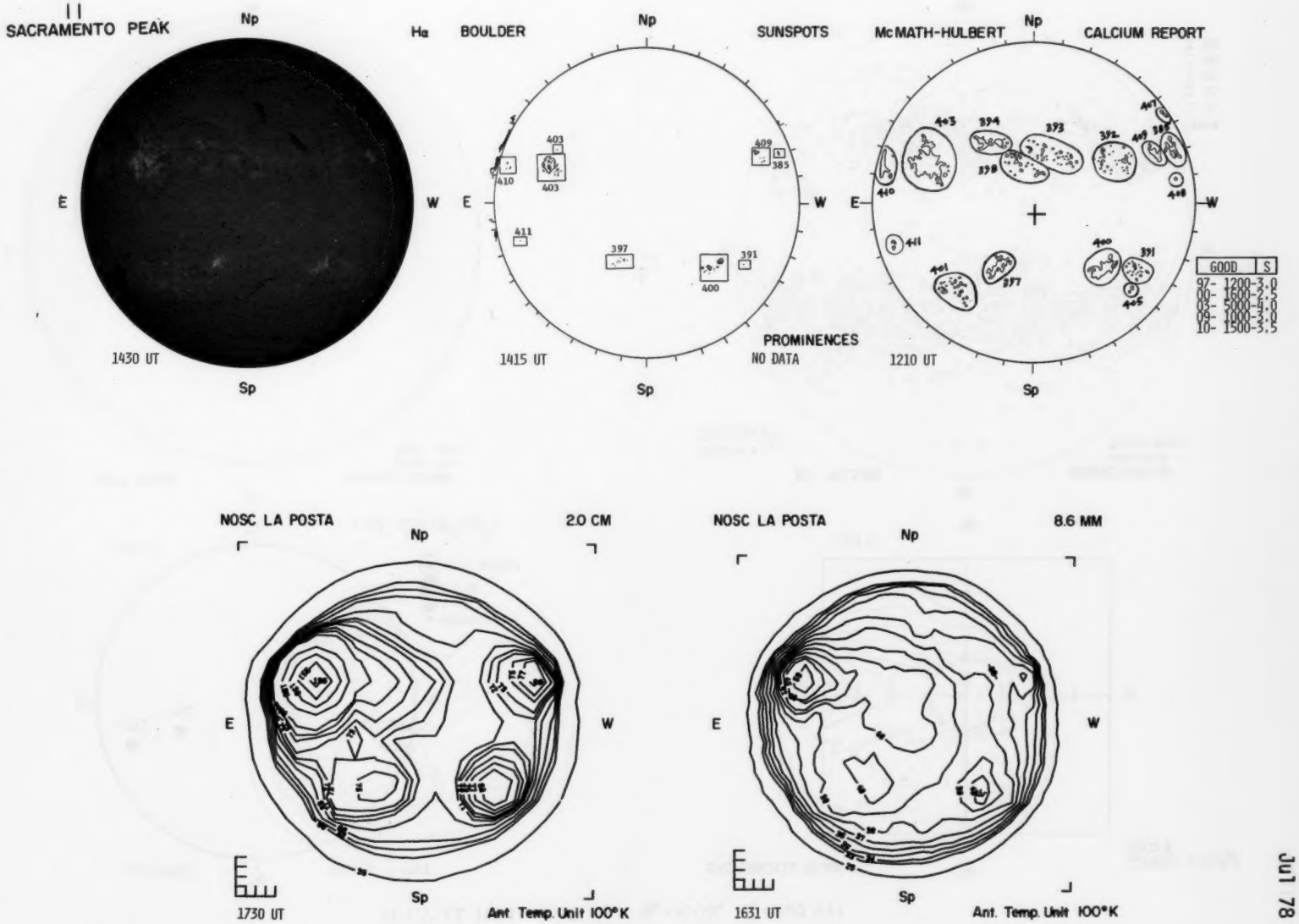
1522 UT

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY = 12.6
DELTAX = 9.5

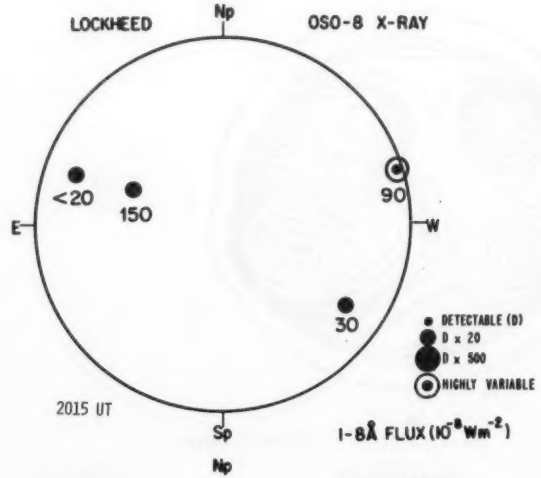


18.44-19.82 UT

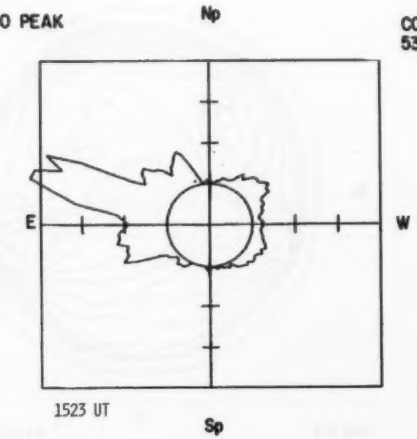

SACRAMENTO PEAK
Np
Hα
E
W
Sp
1430 UT
BOULDER
SUNSPOTS
403
410
403
409
385
411
397
391
400
1415 UT
PROMINENCES
NO DATA
McMATH-HULBERT
CALCIUM REPORT
403
394
393
392
409
385
398
410
408
411
400
391
401
397
405
1210 UT
GOOD
S
97- 1200-3.0
00- 1600-2.5
03- 5000-4.0
09- 1000-3.0
10- 1500-3.5
NOSC LA POSTA
2.0 CM
1730 UT
Ant. Temp. Unit 100°K
NOSC LA POSTA
8.6 MM
1631 UT
Ant. Temp. Unit 100°K

JULY 12, 1978 (P = 2.13, B_o = 4.03, L_o = 205.97)

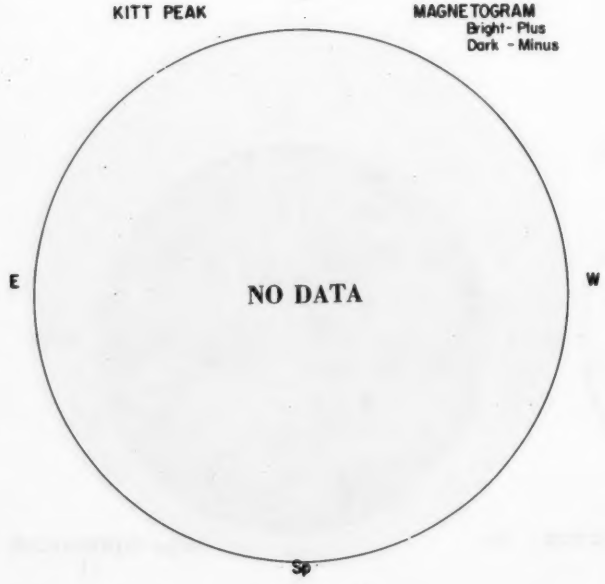
LOCKHEED OSO-8 X-RAY



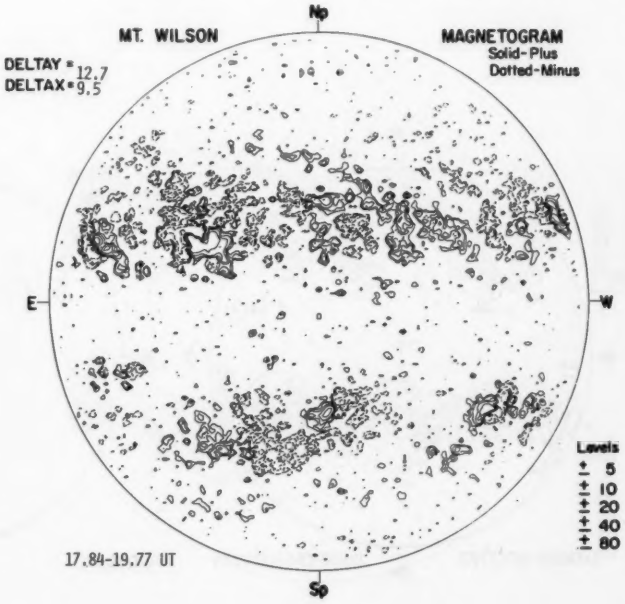
SACRAMENTO PEAK CORONA (1.15 R_o) 5303 Å



KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus

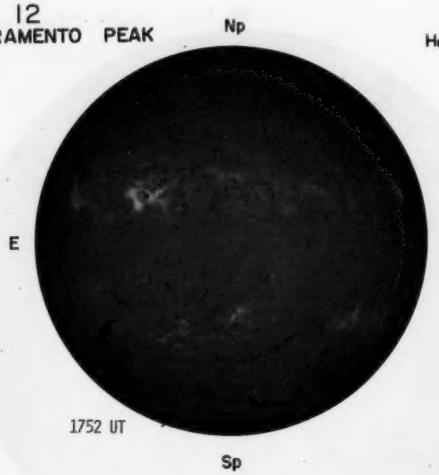


MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

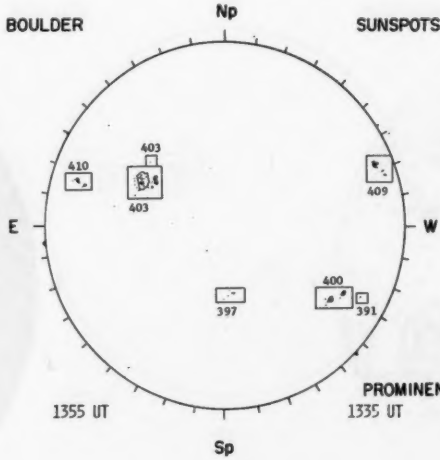


12

SACRAMENTO PEAK

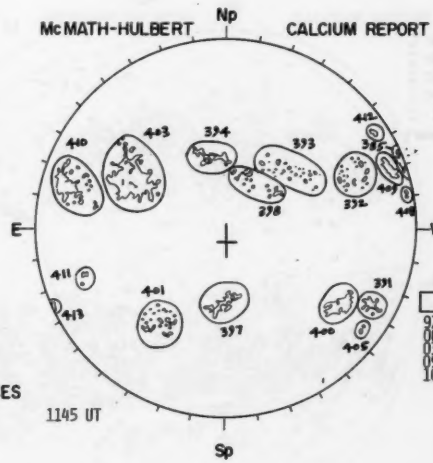


Hα BOULDER



SUNSPOTS

McMATH-HULBERT



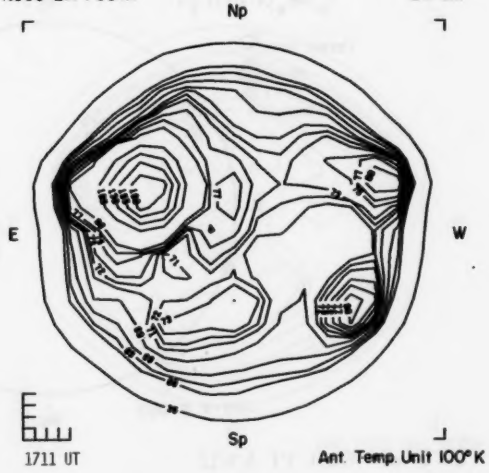
CALCIUM REPORT

GOOD	S
97- 1200-30	
00- 1700-30	
03- 5500-40	
09- 1400-35	
10- 3000-35	

PROMINENCES

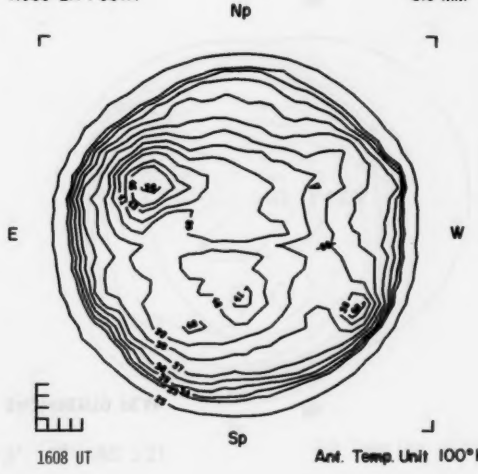
1335 UT

NOSC LA POSTA 2.0 CM



Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM

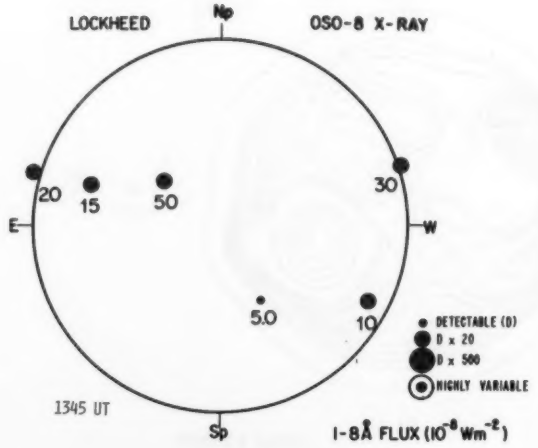


Ant. Temp. Unit 100°K

JULY 13, 1978 (P = 2.57, B_o = 4.13, L_o = 192.73)

52
Jul 78

LOCKHEED OSO-8 X-RAY

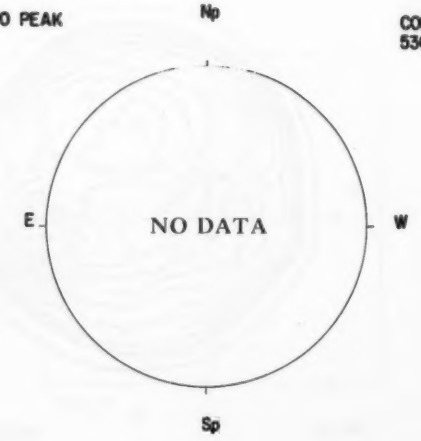


1345 UT

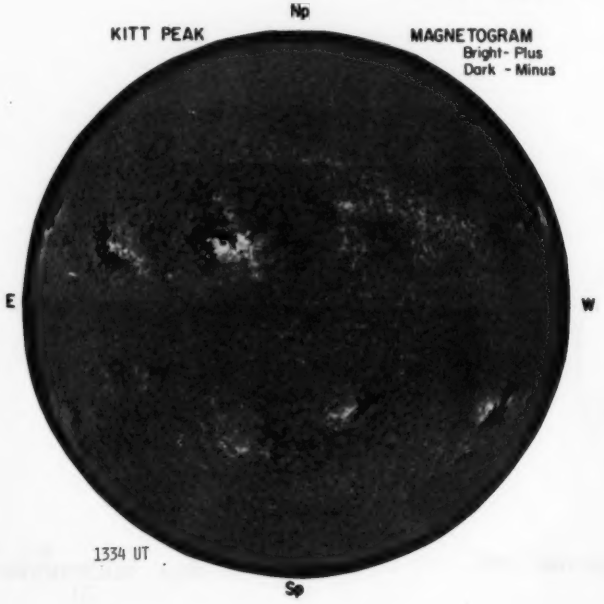
1-8Å FLUX (10^{-6} Wm^{-2})

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



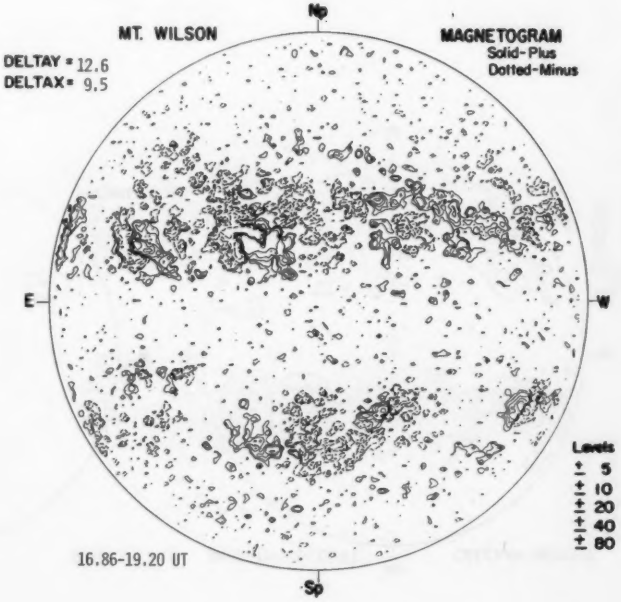
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1334 UT

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

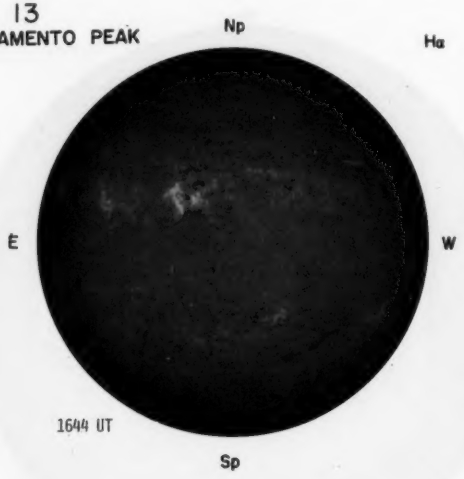
DELTAY = 12.6
DELTAX = 9.5



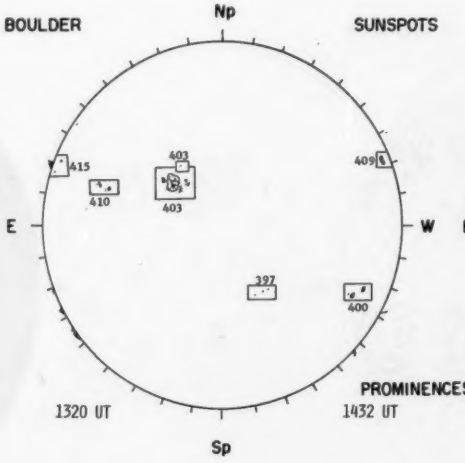
16.86-19.20 UT

13

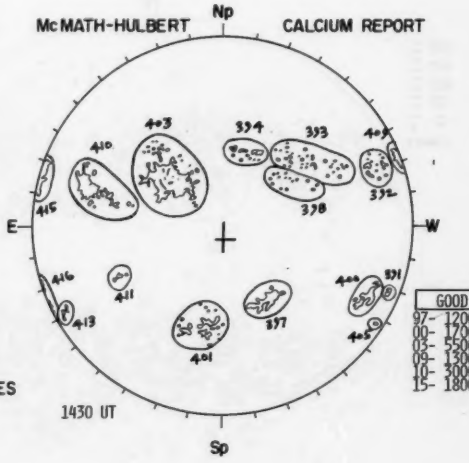
SACRAMENTO PEAK



Hα BOULDER



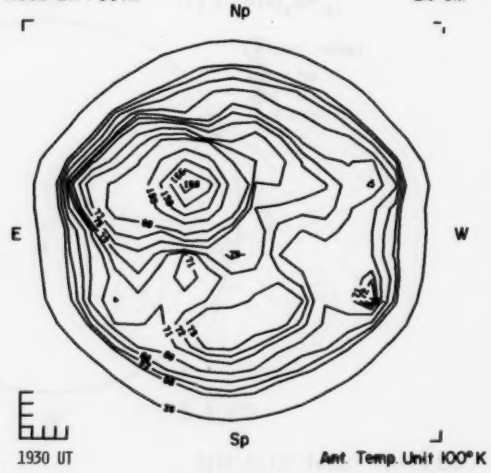
SUNSPOTS



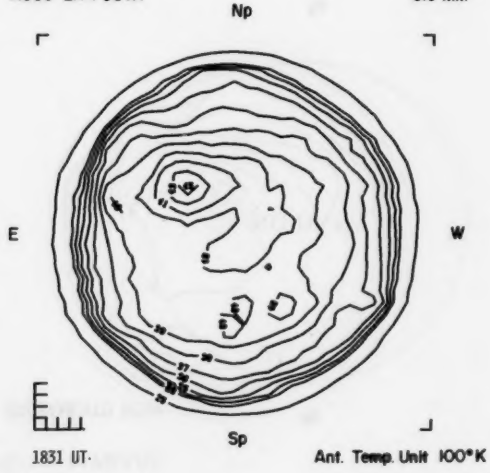
McMATH-HULBERT

CALCIUM REPORT

NOSC LA POSTA 2.0 CM

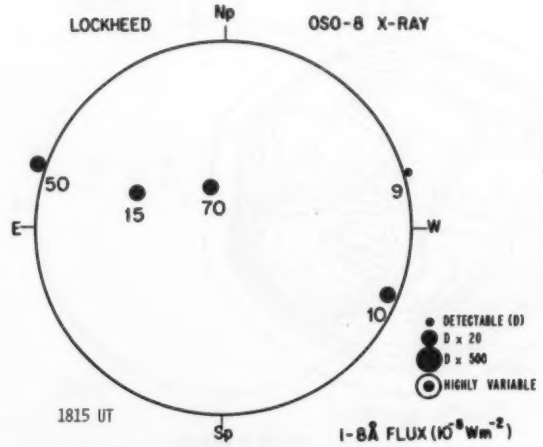


NOSC LA POSTA 8.6 MM



JULY 14, 1978 (P = 3.02, B_0 = 4.23, L_0 = 179.50)

LOCKHEED OSO-8 X-RAY

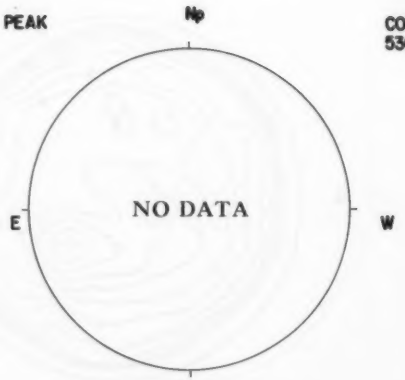


1815 UT

1-8Å FLUX ($K^{\circ}Wm^{-2}$)

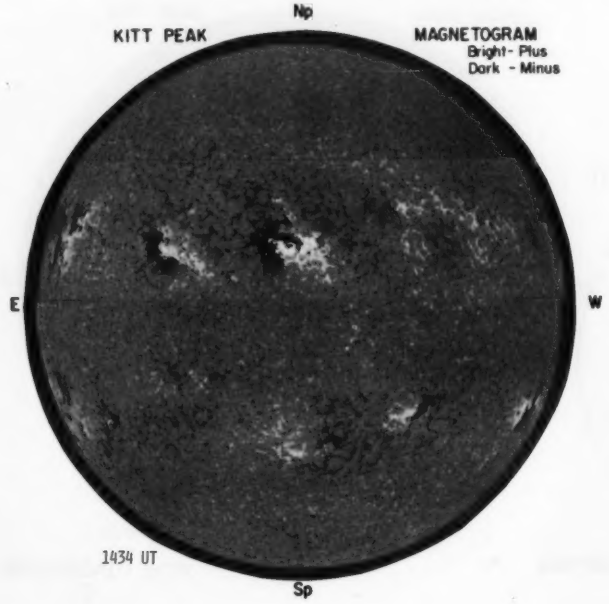
SACRAMENTO PEAK

CORONA (1.15 $R_{\odot}$)
5303 Å



KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus

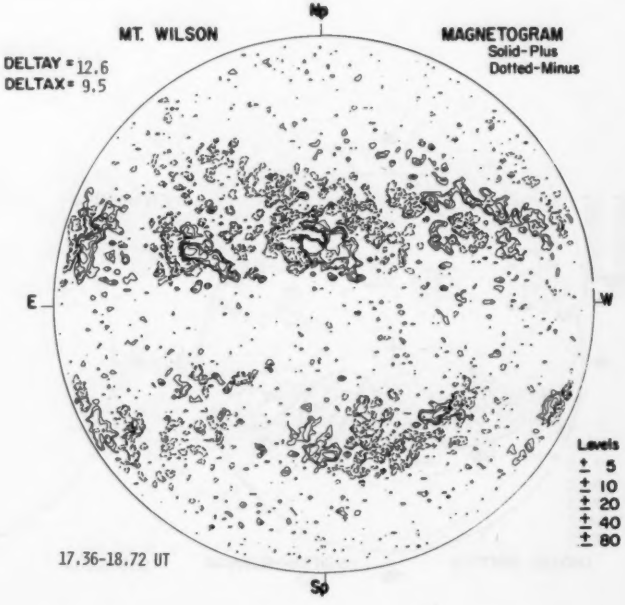


1434 UT

MT. WILSON

MAGNETOGRAM
Solid - Plus
Dotted - Minus

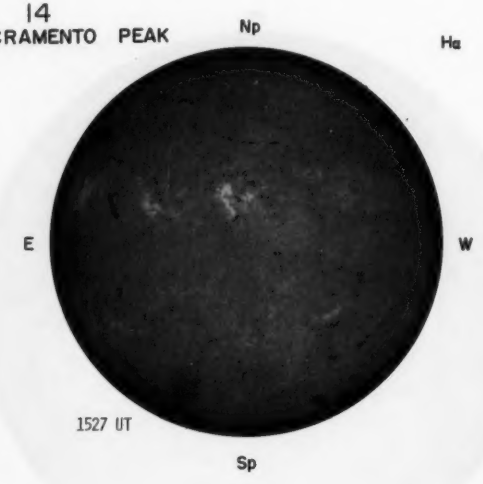
DELTAY = 12.6
DELTAX = 9.5



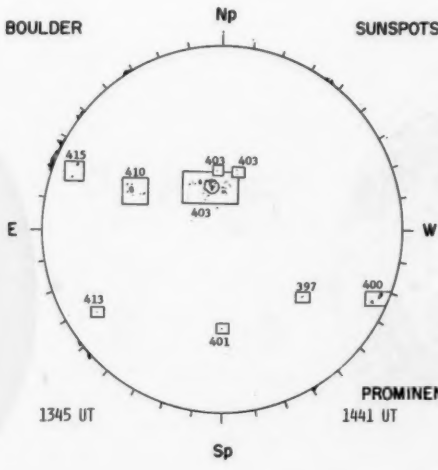
17.36-18.72 UT

14

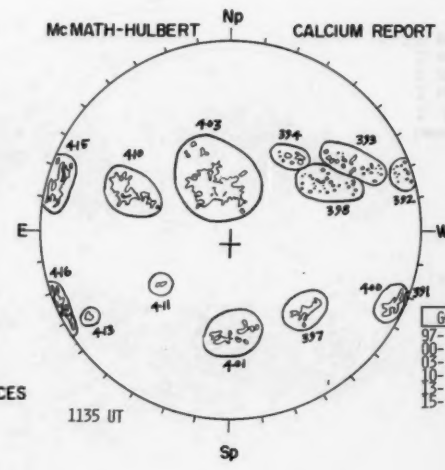
SACRAMENTO PEAK



Hα BOULDER



SUNSPOTS



McMATH-HULBERT

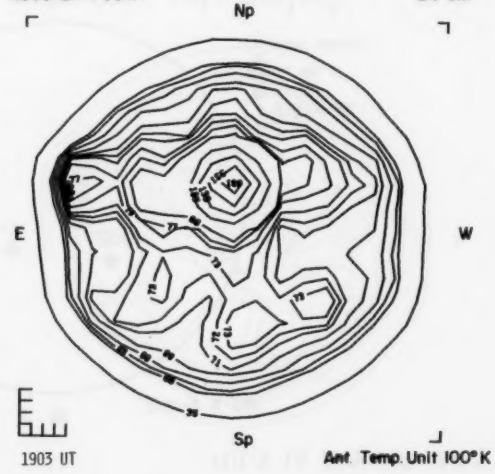
CALCIUM REPORT

GOOD	S
97- 1000	2.5
00- 2000	2.5
03- 5700	3.5
10- 2800	3.5
12- 0500	2.5
15- 3000	2.5

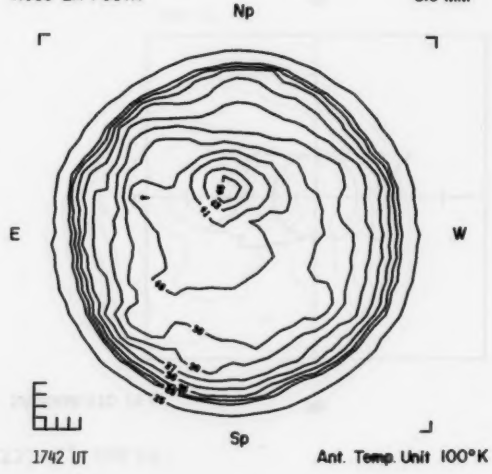
PROMINENCES

1441 UT

NOSC LA POSTA 2.0 CM



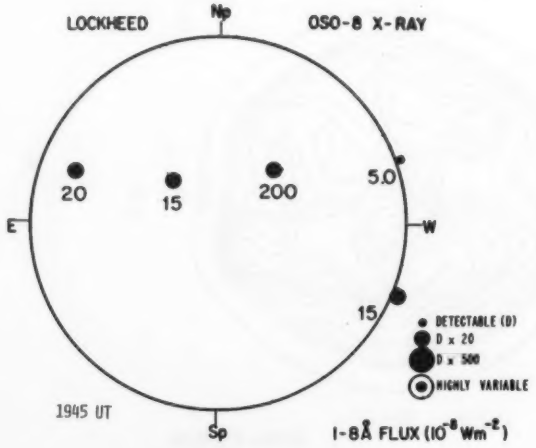
NOSC LA POSTA 8.6 MM



65
Jul 78

JULY 15, 1978 (P = 3.47, B_o = 4.33, L_o = 166.27)

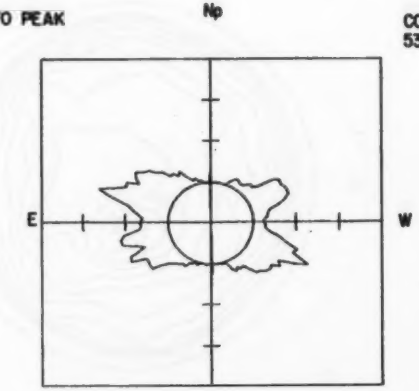
LOCKHEED OSO-8 X-RAY



1945 UT

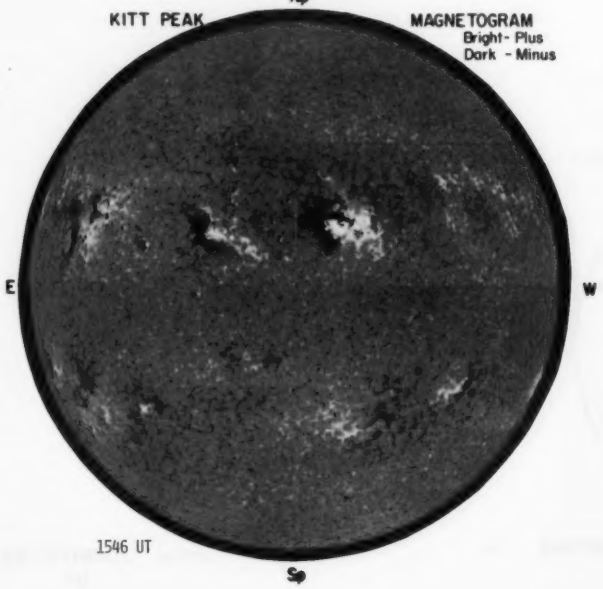
1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



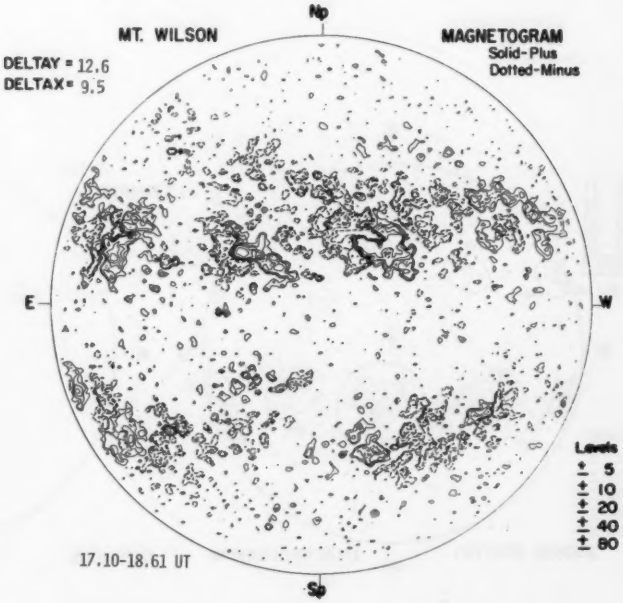
1806 UT

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1546 UT

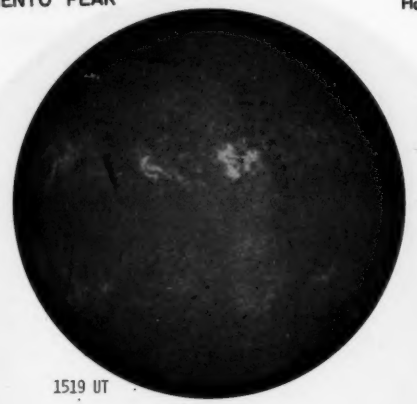
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY = 12.6
DELTAX = 9.5



17.10-18.61 UT

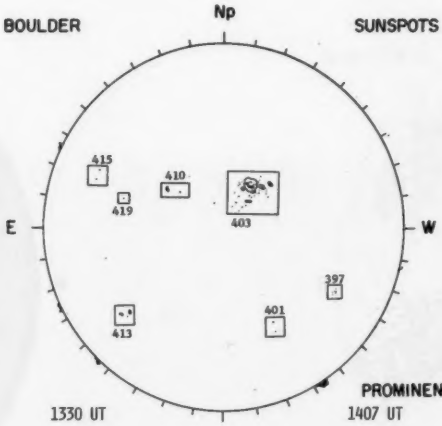
15

SACRAMENTO PEAK



1519 UT

Hα BOULDER



1330 UT

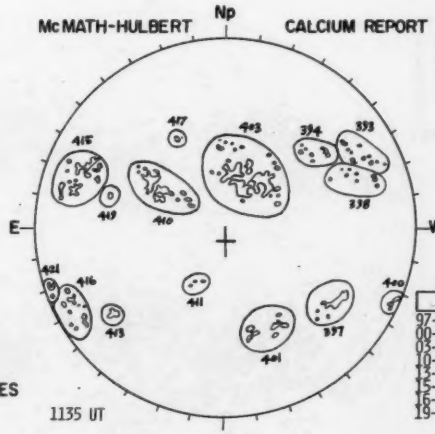
SUNSPOTS

PROMINENCES

1407 UT

McMATH-HULBERT

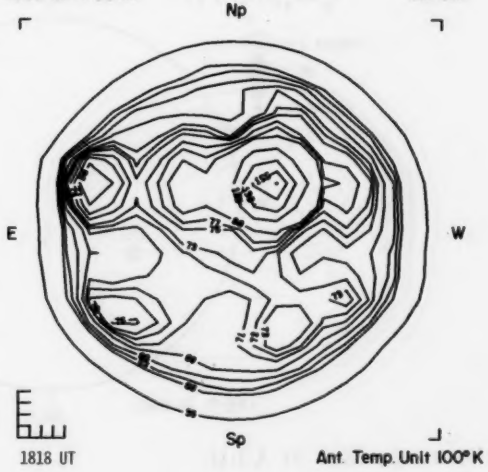
CALCIUM REPORT



1135 UT

POOR	D
97- 1200	3.0
00- 0800	2.5
03- 5500	3.0
10- 2600	3.0
13- 0600	2.5
15- 3500	3.0
16- 1800	2.5
19- 0200	2.5

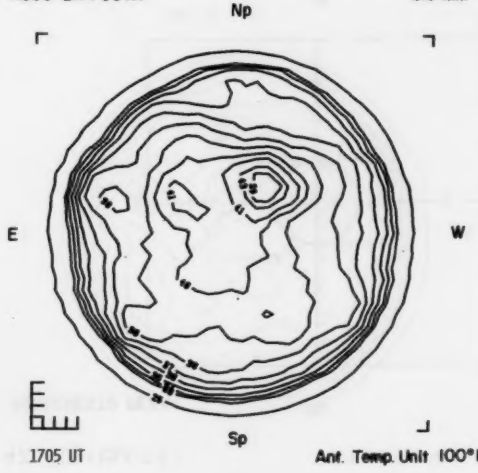
NOSC LA POSTA 2.0 CM



1818 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



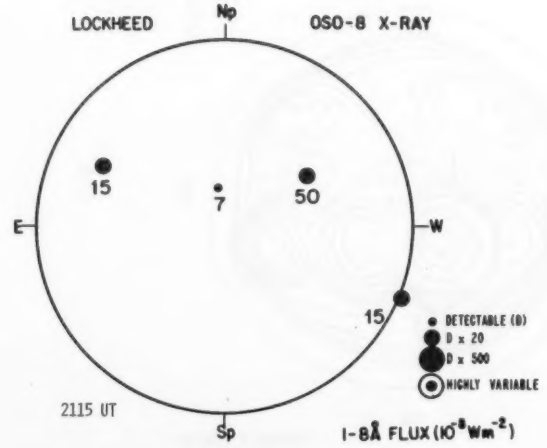
1705 UT

Ant. Temp. Unit 100°K

67
Jul 78

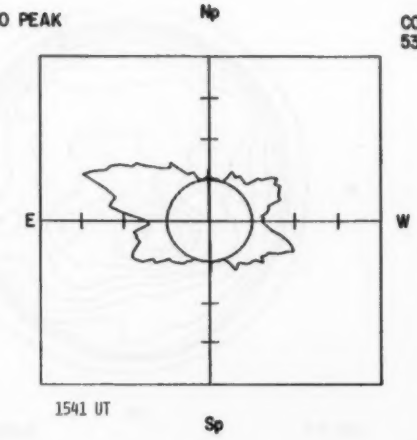
JULY 16, 1978 (P = 3.91, B_o = 4.42, L_o = 153.03)

LOCKHEED OSO-8 X-RAY

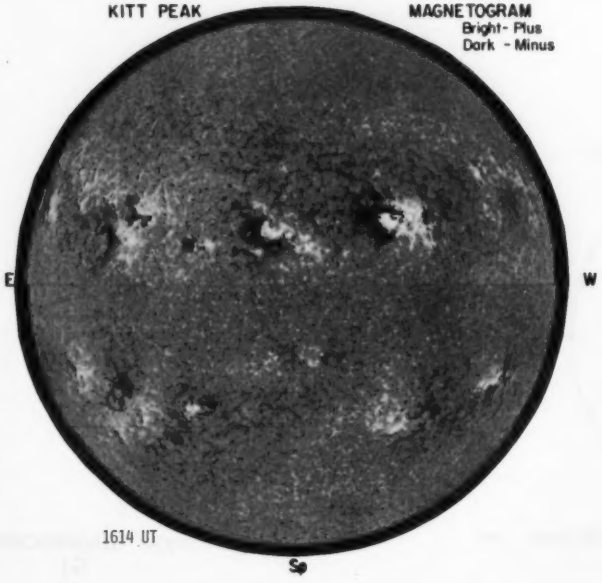


I-8Å FLUX (10^{-8} Wm^{-2})

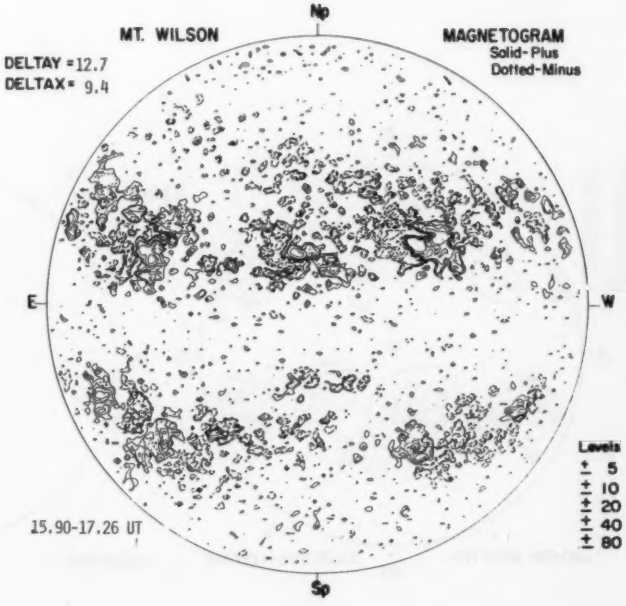
SACRAMENTO PEAK



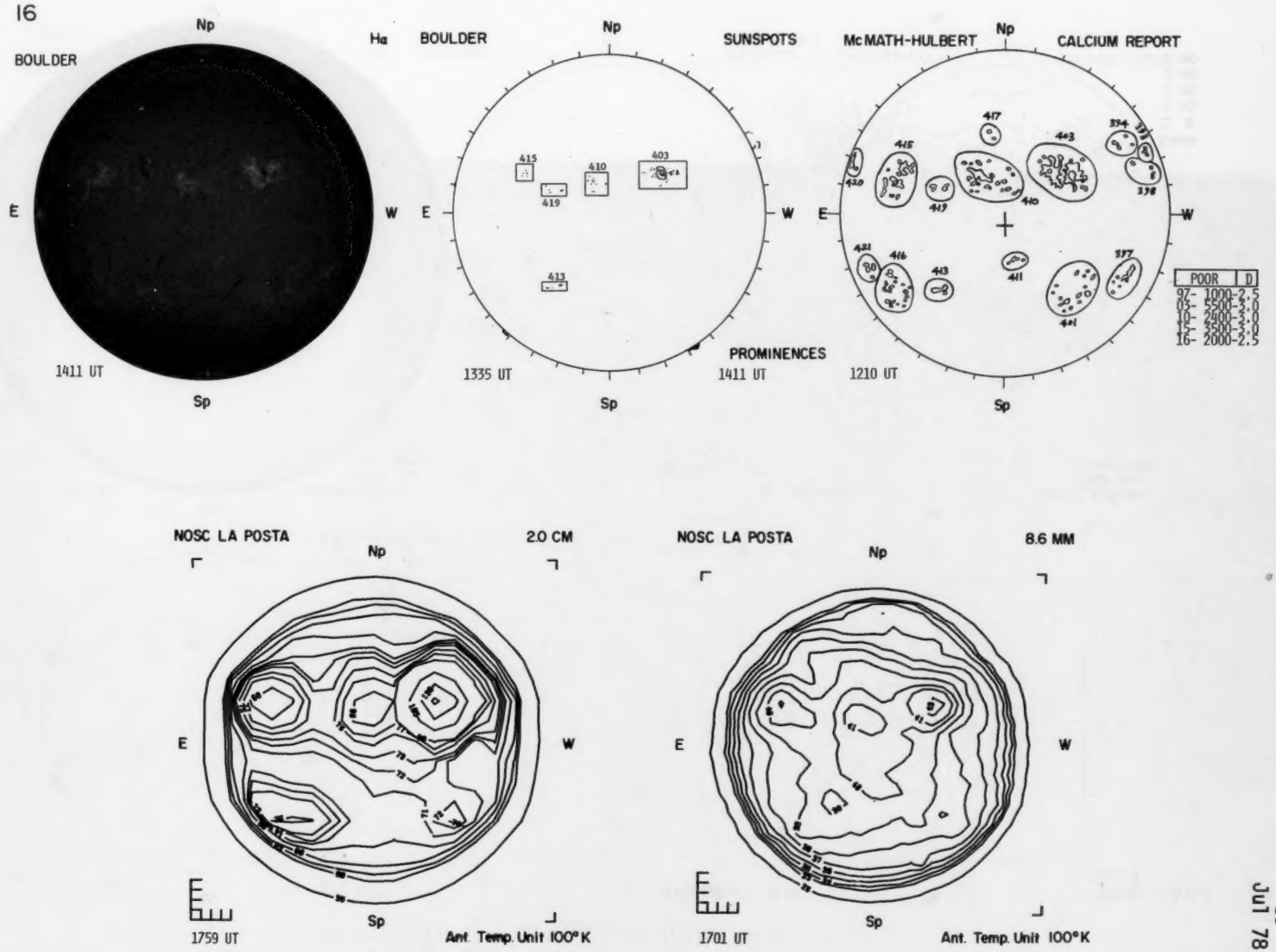
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY = 12.7
DELTAX = 9.4

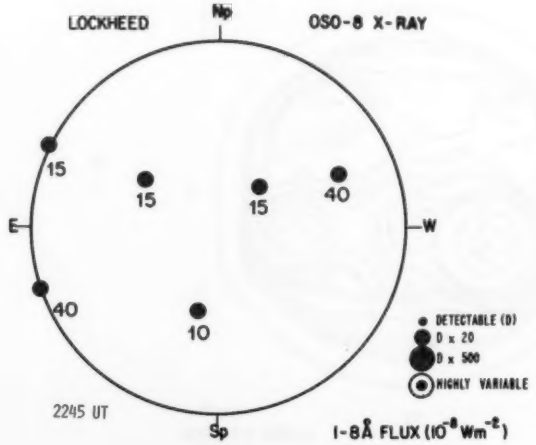


16


BOULDER
Np
Hα
E
W
Sp
1411 UT
BOULDER
SUNSPOTS
415
419
410
403
413
1335 UT
PROMINENCES
1411 UT
McMATH-HULBERT
CALCIUM REPORT
417
415
403
394
420
419
410
398
421
416
413
411
397
401
1210 UT
POOR D
97- 1000-2.5
03- 5500-3.0
10- 2400-3.0
15- 3500-3.0
16- 2000-2.5
NOSC LA POSTA
2.0 CM
1759 UT
Ant. Temp. Unit 100°K
NOSC LA POSTA
8.6 MM
1701 UT
Ant. Temp. Unit 100°K

JULY 17, 1978 (P = 4.35, B_o = 4.52, L_o = 139.80)

LOCKHEED OSO-8 X-RAY

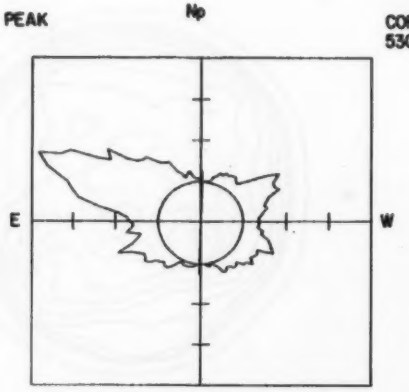


2245 UT

1-8Å FLUX (10^{-8} Wm^{-2})

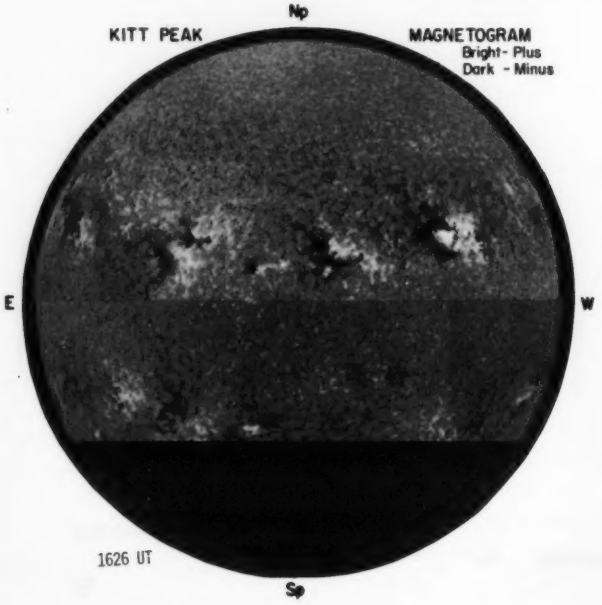
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



1622 UT

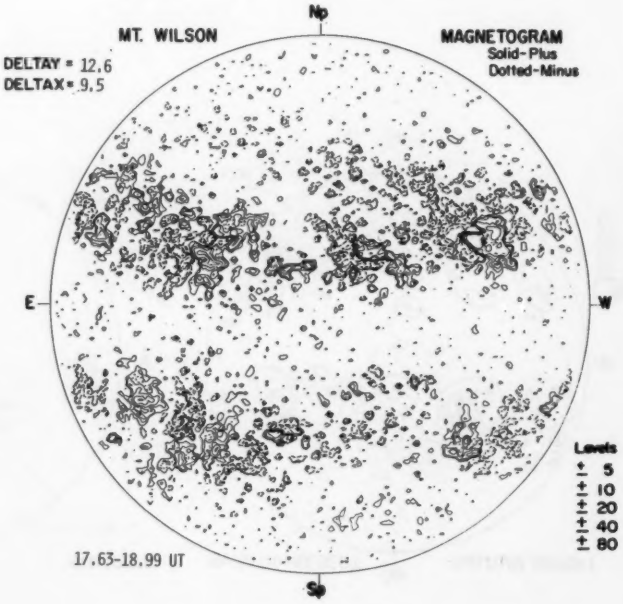
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1626 UT

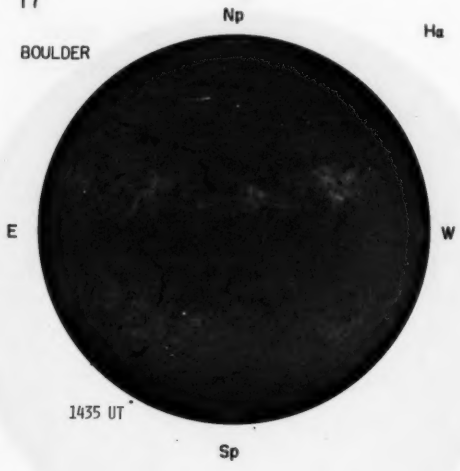
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

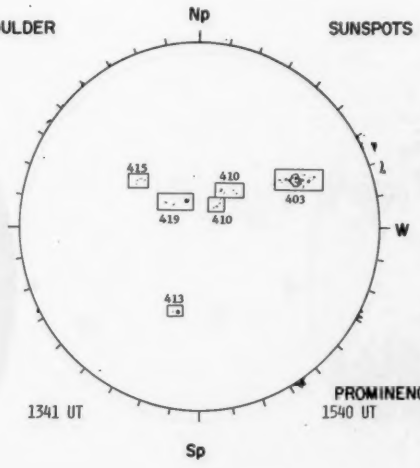
DELTAY = 12.6
DELTAX = 9.5

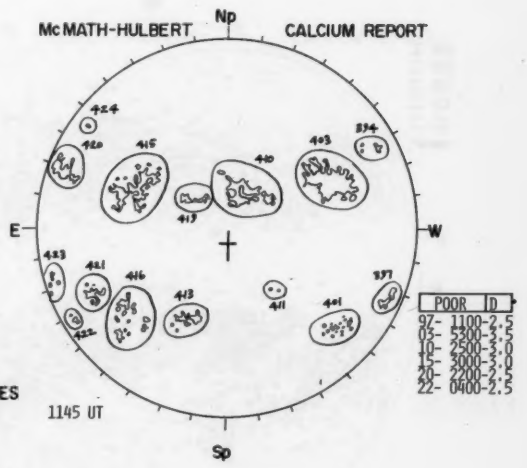


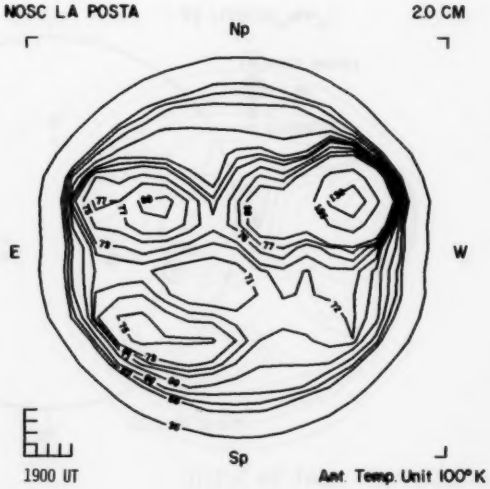
17.63-18.99 UT

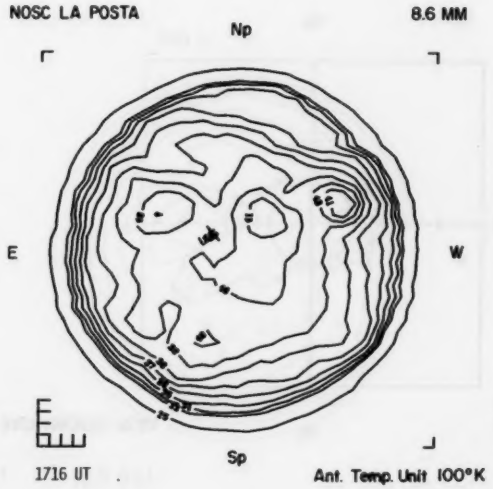
17


Np
BOULDER
Hα
E
W
Sp
1435 UT


Np
BOULDER
SUNSPOTS
E
W
Sp
1341 UT
415
419
410
410
403
413
PROMINENCES
1540 UT


Np
McMATH-HULBERT
CALCIUM REPORT
E
W
Sp
1145 UT
POOR
97- 1100-2.5
05- 5300-3.5
10- 2500-3.0
15- 3000-3.5
20- 2200-2.5
22- 0400-2.5

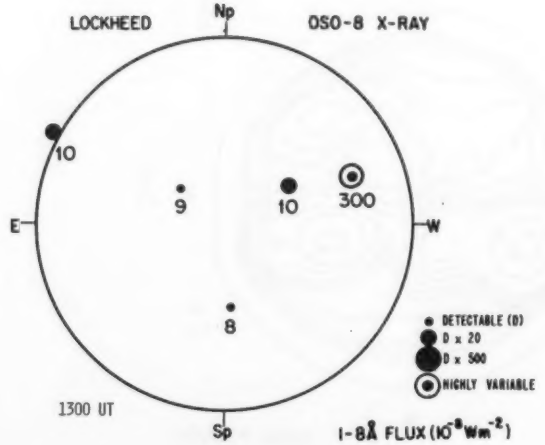

NOSC LA POSTA
2.0 CM
Np
E
W
Sp
1900 UT
Ant. Temp. Unit 100°K


NOSC LA POSTA
8.6 MM
Np
E
W
Sp
1716 UT
Ant. Temp. Unit 100°K

71
Jul 78

JULY 18, 1978 (P = 4.79, B_0 = 4.61, L_0 = 126.57)

LOCKHEED OSO-8 X-RAY

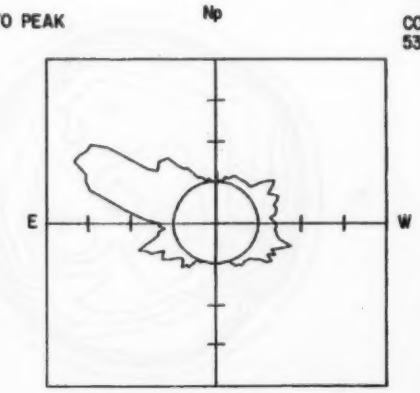


1300 UT

1-8Å FLUX (10^{-8} Wm^{-2})

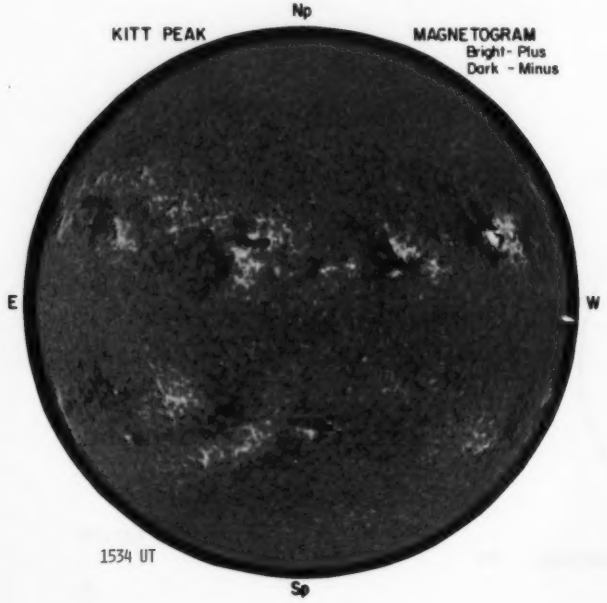
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



1507 UT

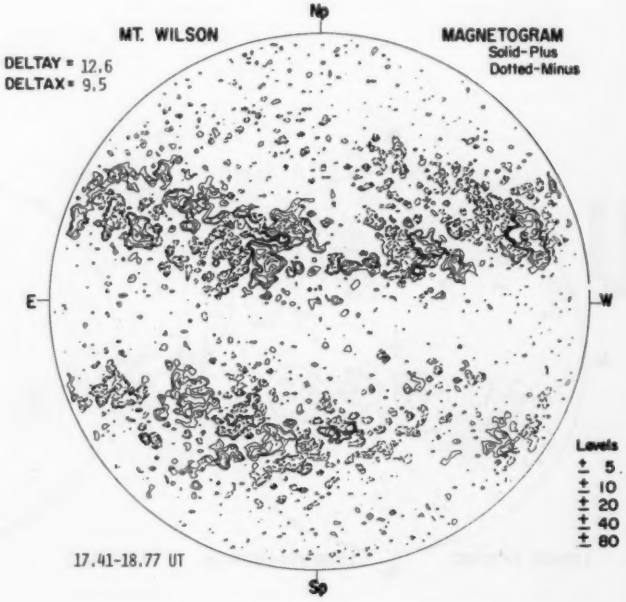
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1534 UT

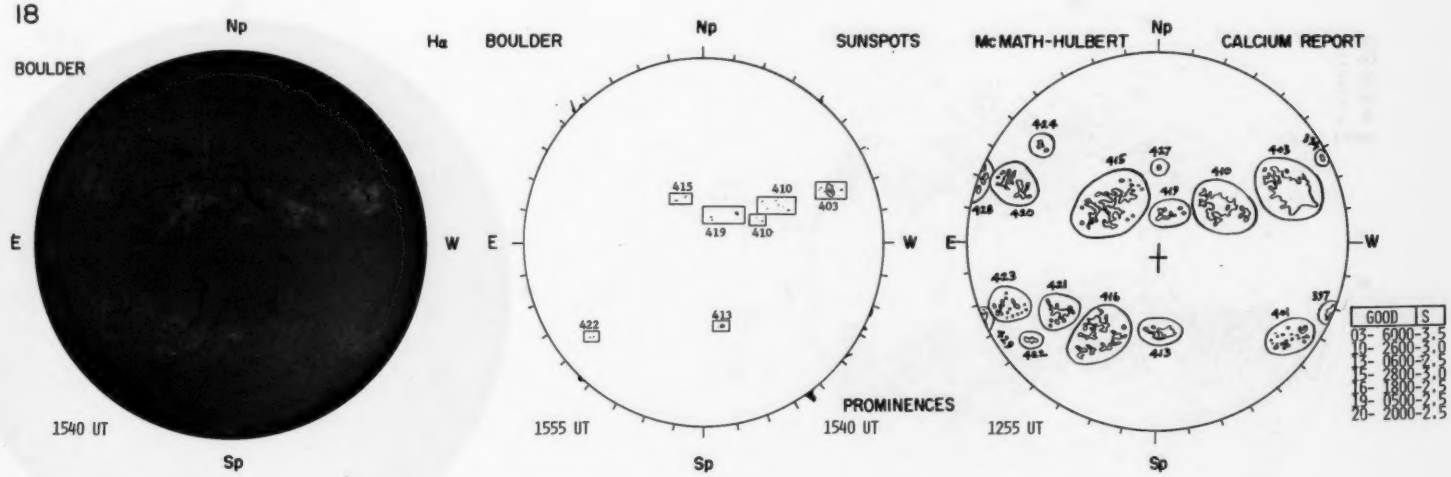
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

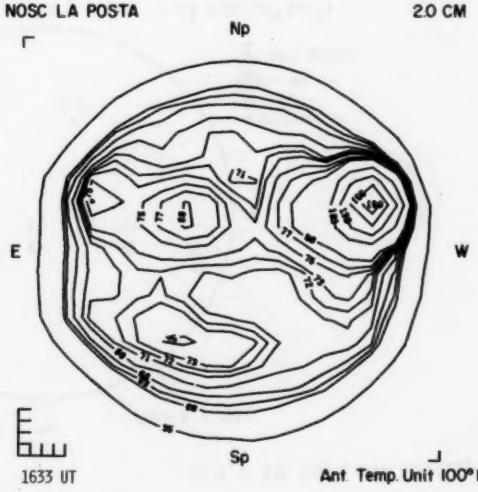
DELTAY = 12.6
DELTAX = 9.5

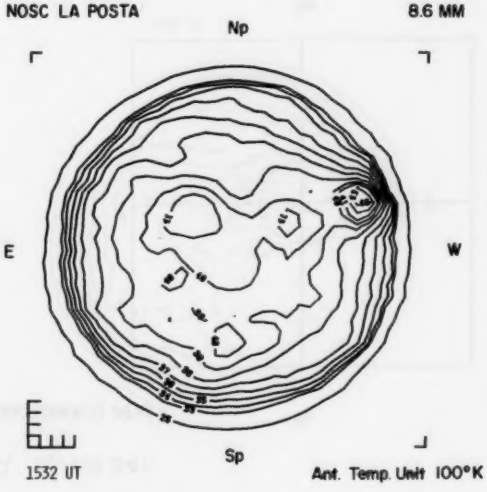


17.41-18.77 UT

18


BOULDER
Np
E
W
Sp
1540 UT
Hα BOULDER
Np
E
W
Sp
1555 UT
SUNSPOTS
415
410
403
419
410
413
422
PROMINENCES
1540 UT
McMATH-HULBERT
Np
E
W
Sp
1255 UT
CALCIUM REPORT
GOOD S
03- 6000-2.5
10- 2600-3.0
13- 0600-2.5
15- 2800-3.0
16- 1800-2.5
19- 0500-2.5
20- 2000-2.5

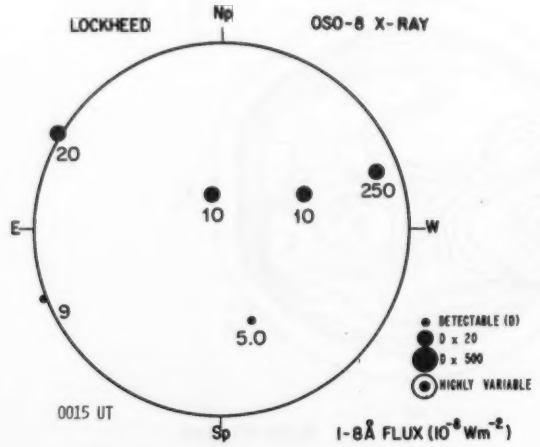

NOSC LA POSTA
2.0 CM
Np
E
W
Sp
1633 UT
Ant. Temp. Unit 100°K


NOSC LA POSTA
8.6 MM
Np
E
W
Sp
1532 UT
Ant. Temp. Unit 100°K

73
Jul 78

JULY 19, 1978 (P = 5.23, B_o = 4.70, L_o = 113.34)

LOCKHEED OSO-8 X-RAY

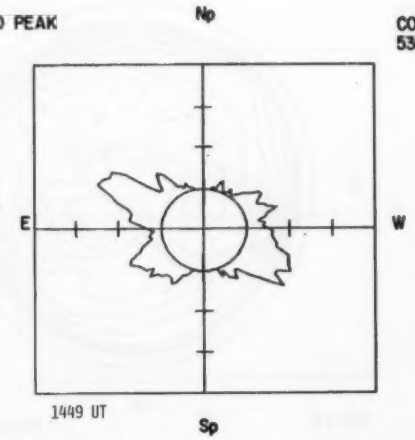


0015 UT

1-8Å FLUX (10^{-6} Wm^{-2})

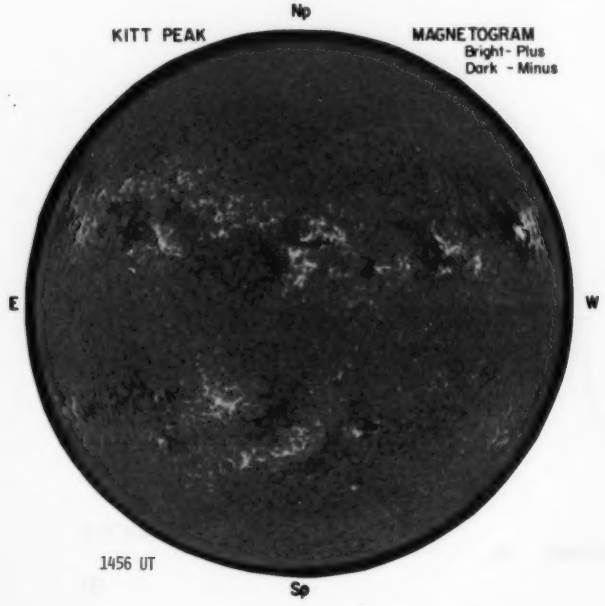
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



1449 UT

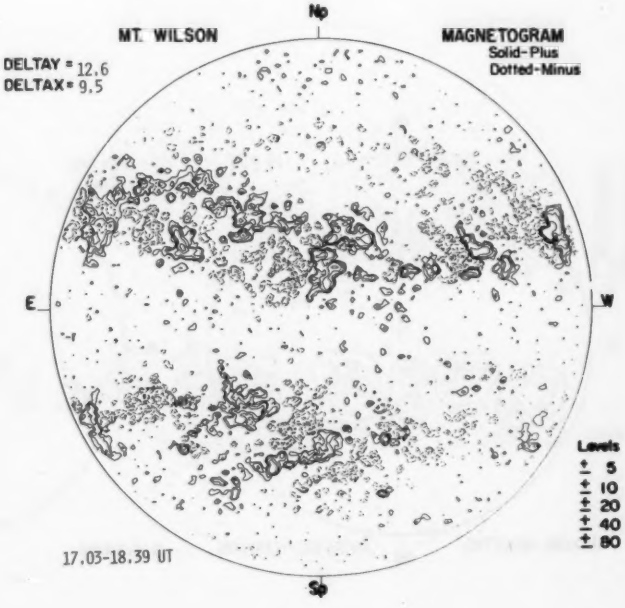
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1456 UT

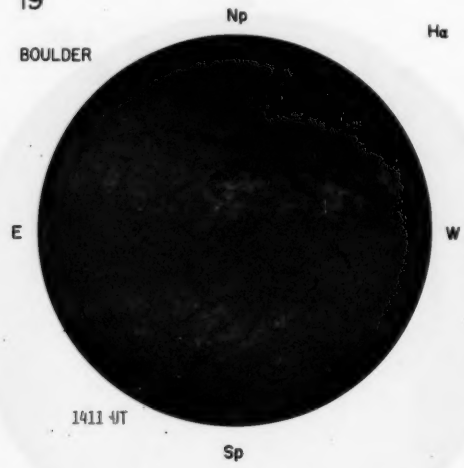
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

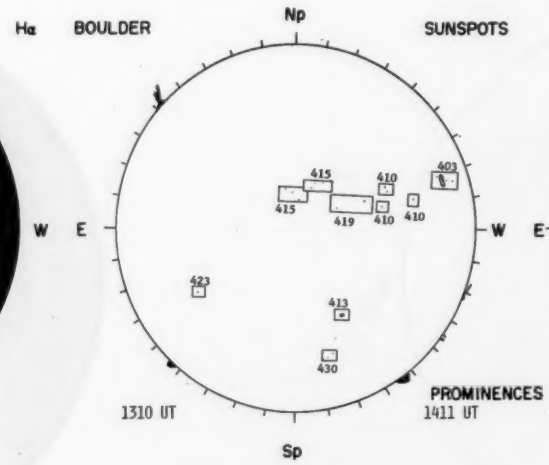
DELTAY = 12.6
DELTAX = 9.5

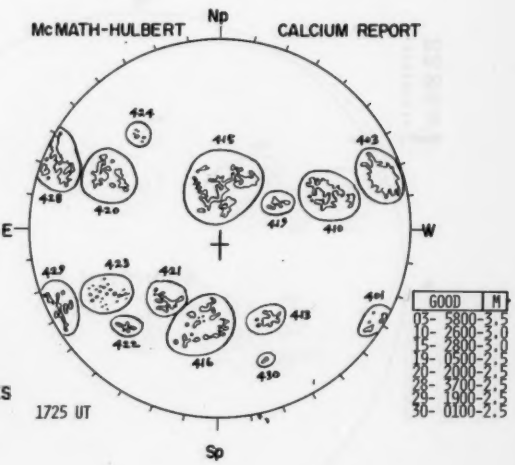


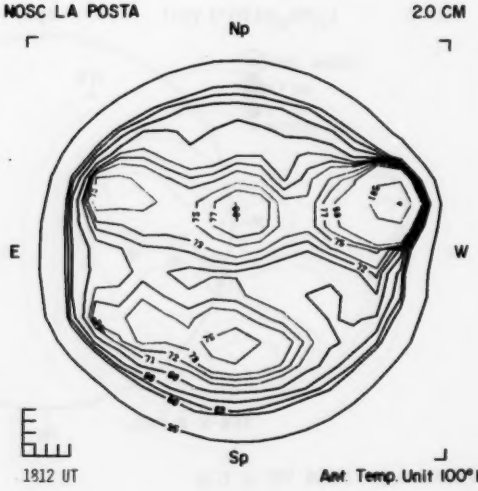
17.03-18.39 UT

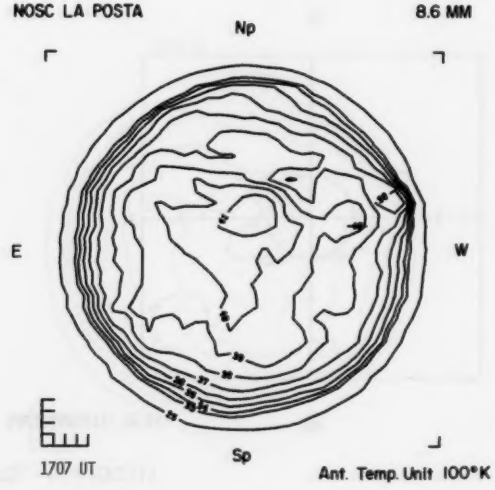
19


BOULDER
Np
E
W
Sp
1411 UT


Hα BOULDER
Np
E
W
Sp
1310 UT
SUNSPOTS
415
410
403
415
419
410
410
423
413
430
PROMINENCES
1411 UT


McMATH-HULBERT
Np
E
W
Sp
1725 UT
CALCIUM REPORT
GOOD
M
01- 5800-3.5
10- 2600-3.0
15- 2800-3.0
19- 0500-2.5
20- 2000-2.5
28- 3700-2.5
29- 1900-2.5
30- 0100-2.5

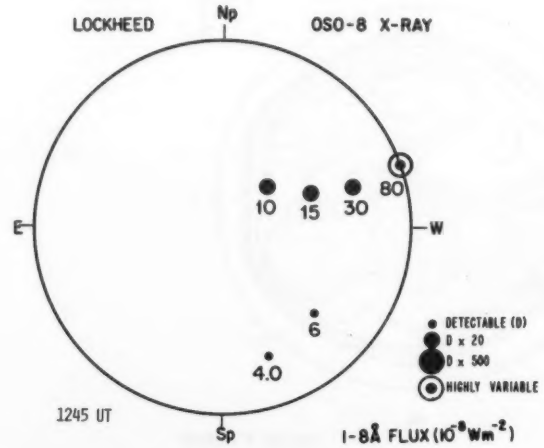

NOSC LA POSTA
2.0 CM
Np
E
W
Sp
1812 UT
Ant. Temp. Unit 100°K


NOSC LA POSTA
8.6 MM
Np
E
W
Sp
1707 UT
Ant. Temp. Unit 100°K

75
Jul 78

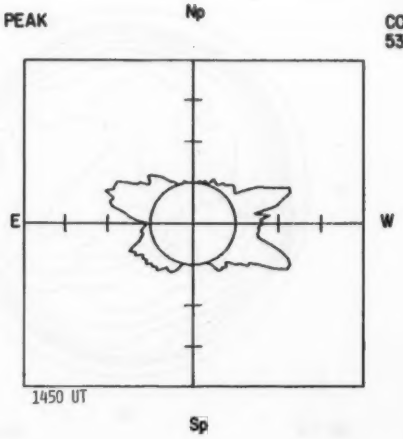
JULY 20, 1978 (P = 5.67, B_o = 4.79, L_o = 100.11)

LOCKHEED OSO-8 X-RAY

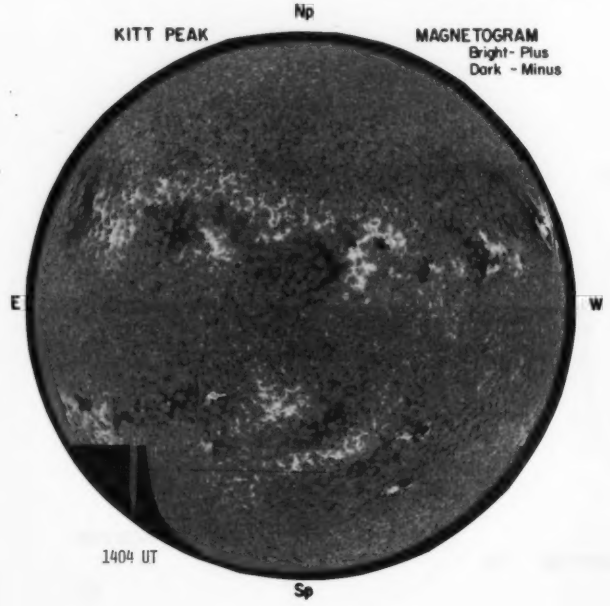


I-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

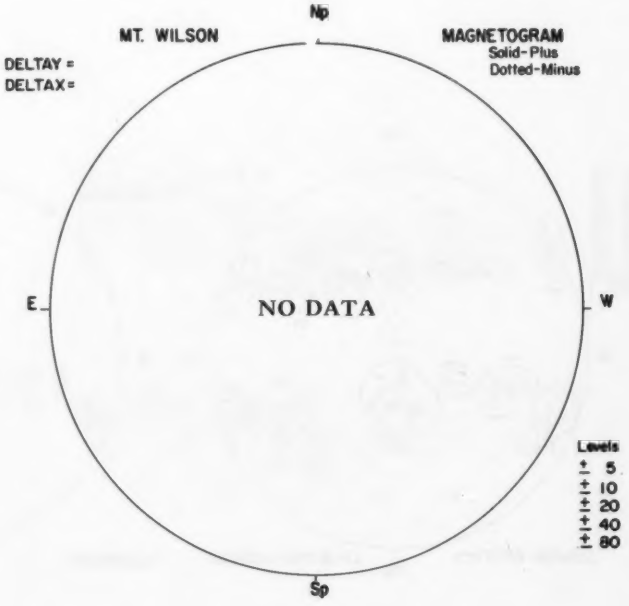


KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus

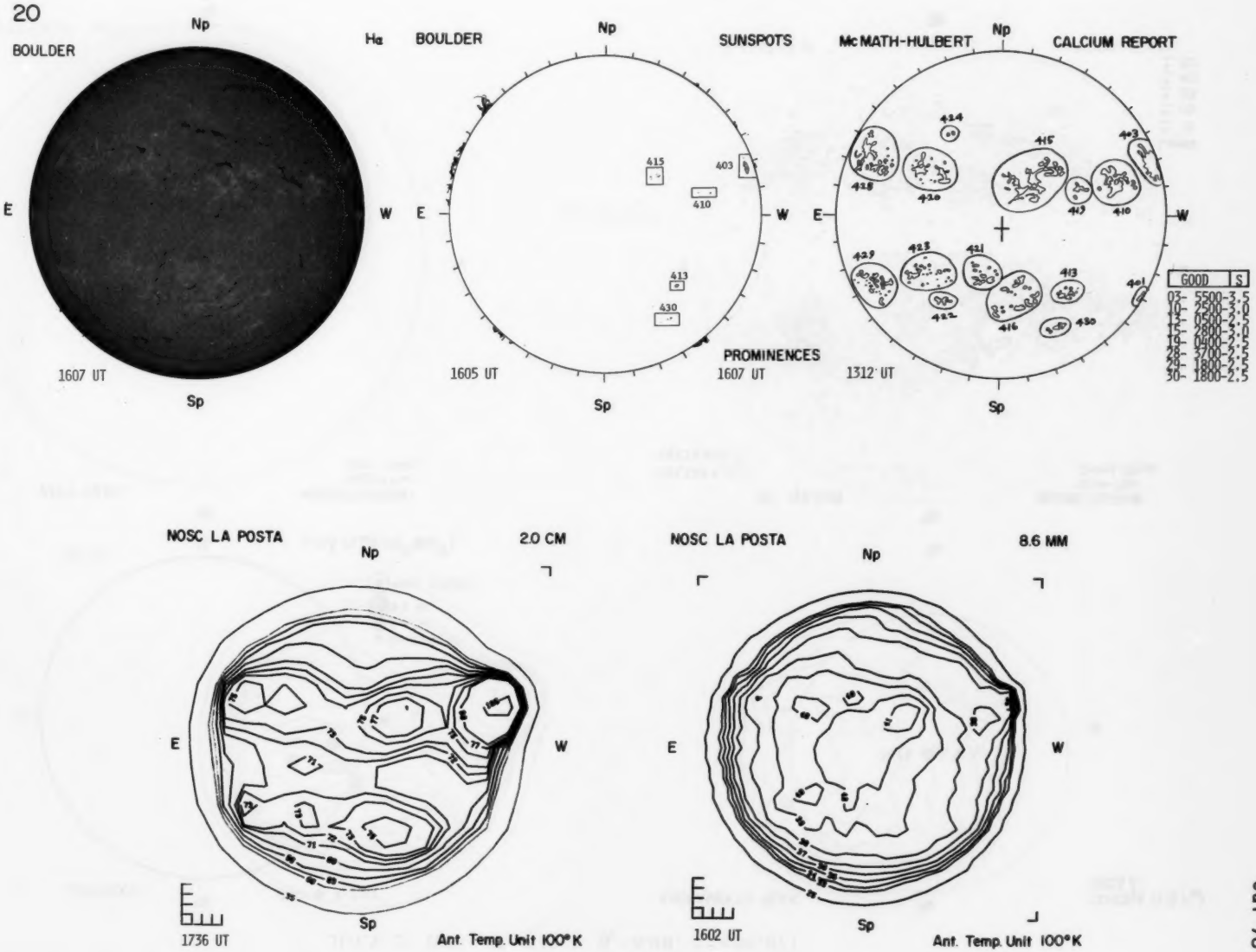


MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =

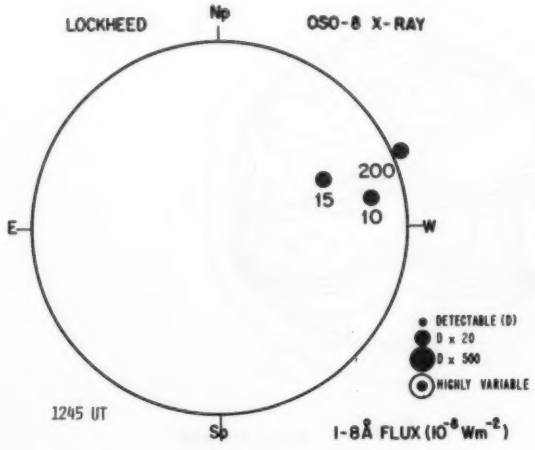


20

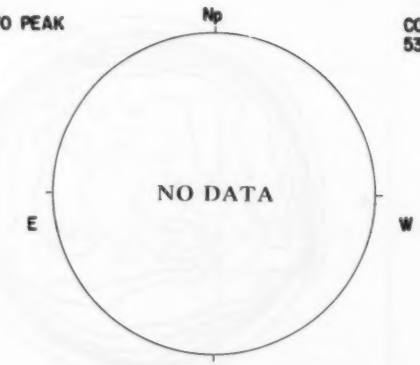

BOULDER
Np
Hα
E
W
Sp
1607 UT
BOULDER
SUNSPOTS
415
403
410
413
430
1605 UT
PROMINENCES
1607 UT
McMATH-HULBERT
CALCIUM REPORT
424
415
403
428
420
419
410
429
423
421
413
401
422
416
430
1312 UT
GOOD S
03- 5500-3.5
10- 2500-3.0
13- 0500-2.5
15- 2800-3.0
19- 0400-2.5
28- 3700-2.5
29- 1800-2.5
30- 1800-2.5
NOSC LA POSTA
2.0 CM
1736 UT
Ant. Temp. Unit 100°K
NOSC LA POSTA
8.6 MM
1602 UT
Ant. Temp. Unit 100°K

JULY 21, 1978 (P = 6.10, B_o = 4.88, L_o = 86.87)

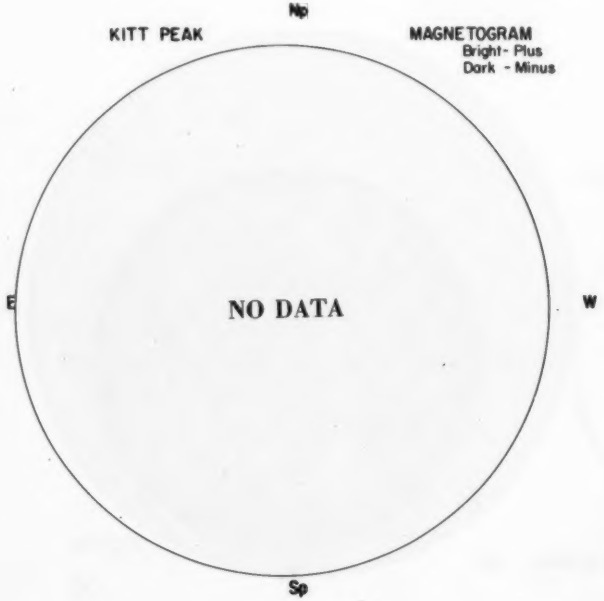
LOCKHEED OSO-8 X-RAY



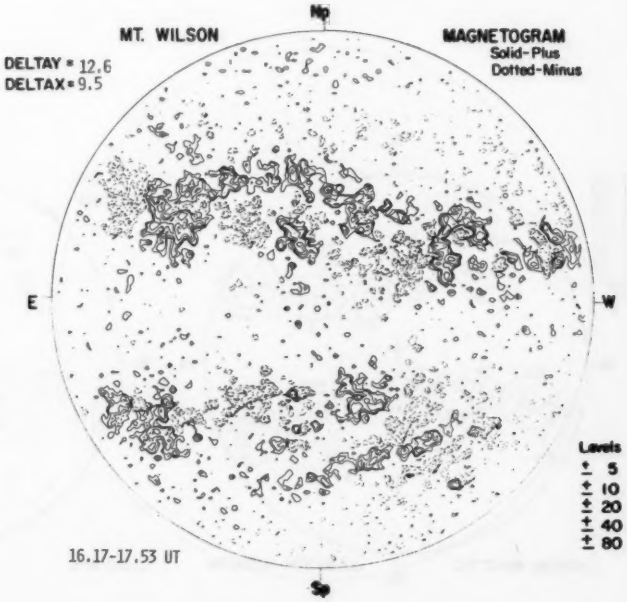
SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus

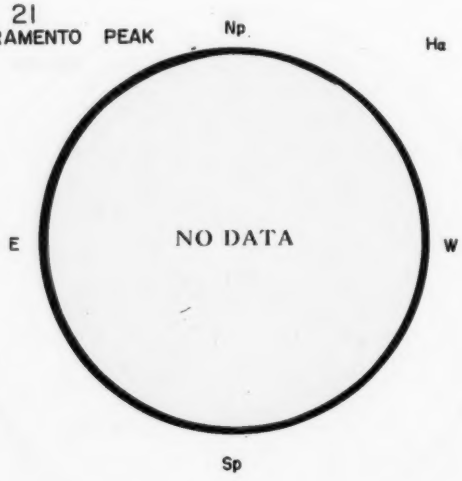


MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY = 12.6
DELTAX = 9.5

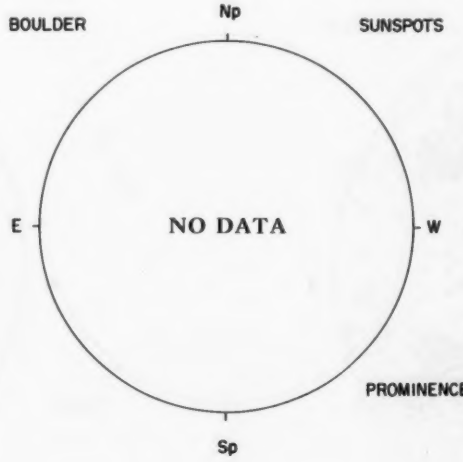


21

SACRAMENTO PEAK



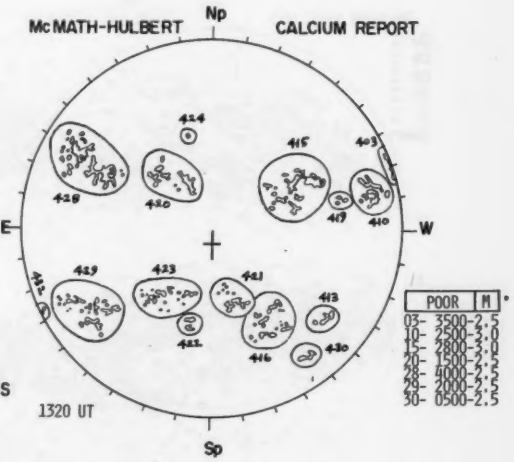
Hα BOULDER



SUNSPOTS

McMATH-HULBERT

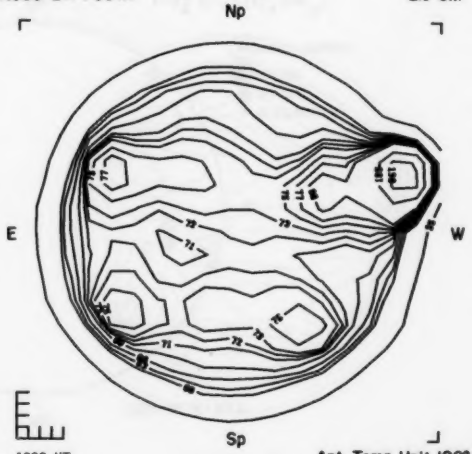
CALCIUM REPORT



PROMINENCES

1320 UT

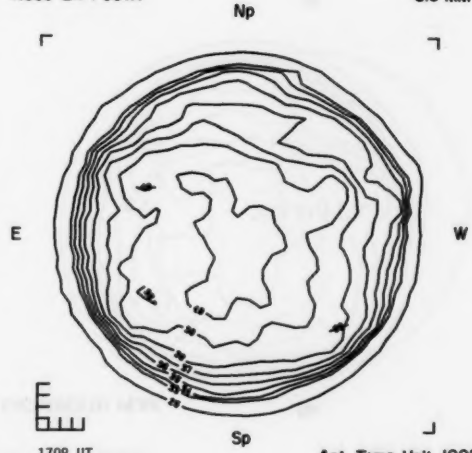
NOSC LA POSTA 2.0 CM



1829 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



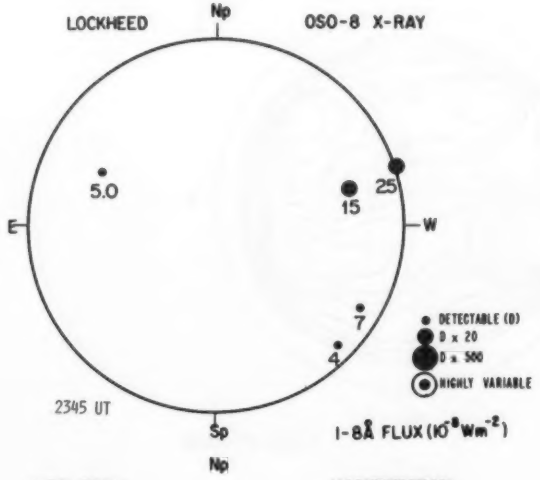
1708 UT

Ant. Temp. Unit 100°K

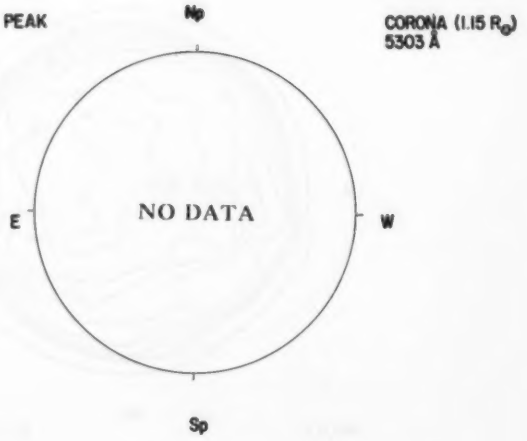
79
Jul 78

JULY 22, 1978 (P = 6.53, B_o = 4.97, L_o = 73.64)

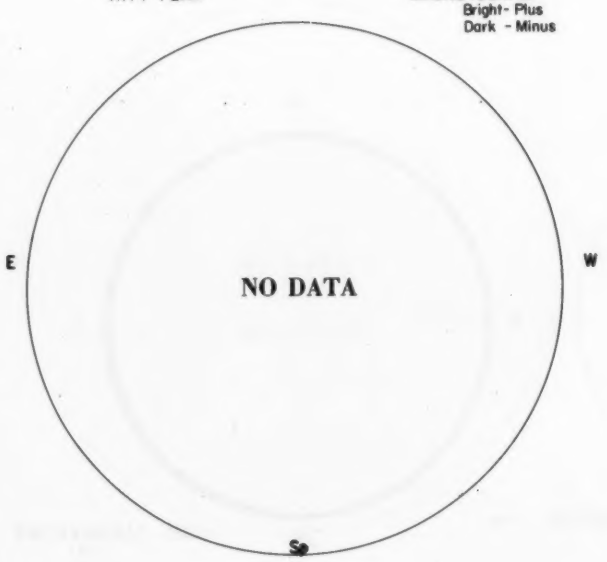
LOCKHEED OSO-8 X-RAY



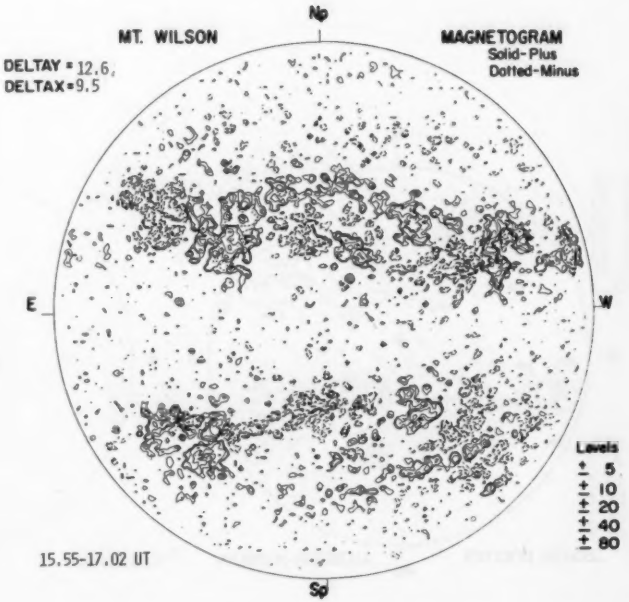
SACRAMENTO PEAK



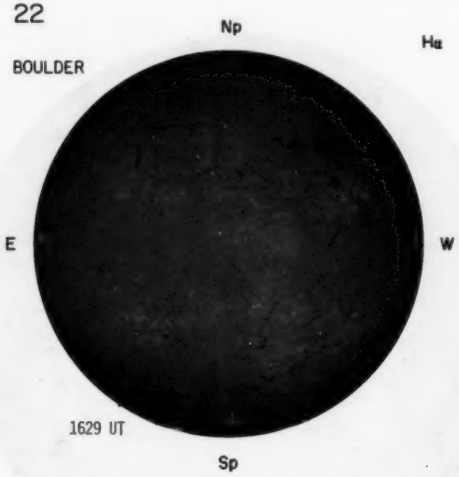
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus

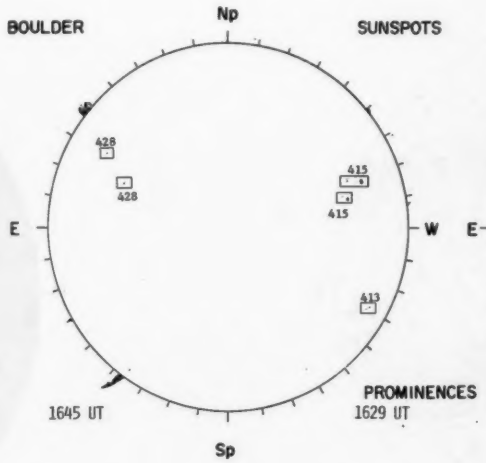


MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

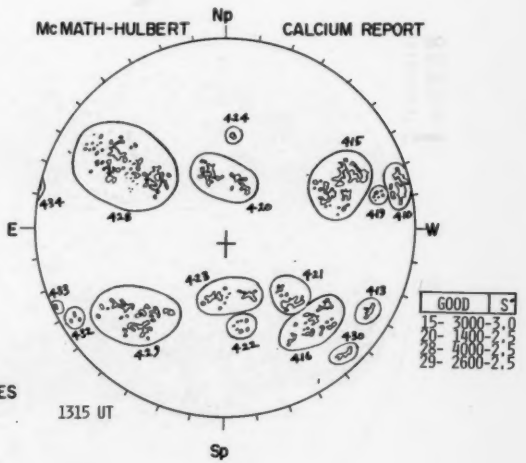


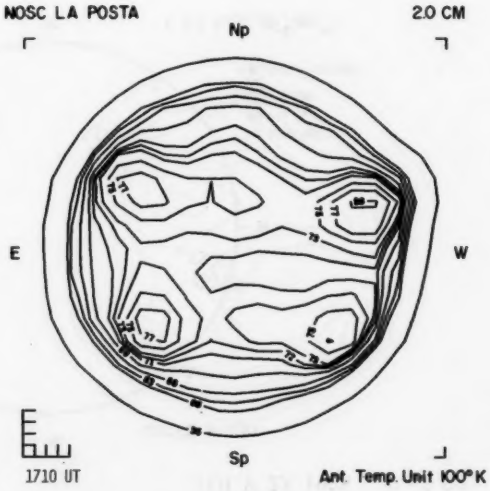
22

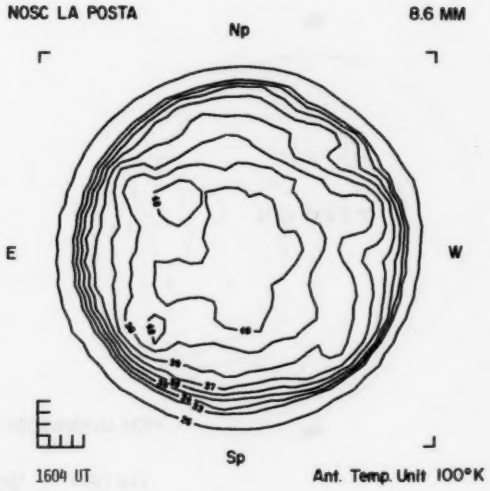

Np
BOULDER
E
W
Sp
1629 UT


Hα BOULDER
Np
E
W
Sp
1645 UT

SUNSPOTS
Np
E
W
Sp
1629 UT
PROMINENCES


McMATH-HULBERT
CALCIUM REPORT
Np
E
W
Sp
1315 UT
GOOD
15- 3000-3.0
20- 1400-2.5
28- 4000-2.5
29- 2600-2.5

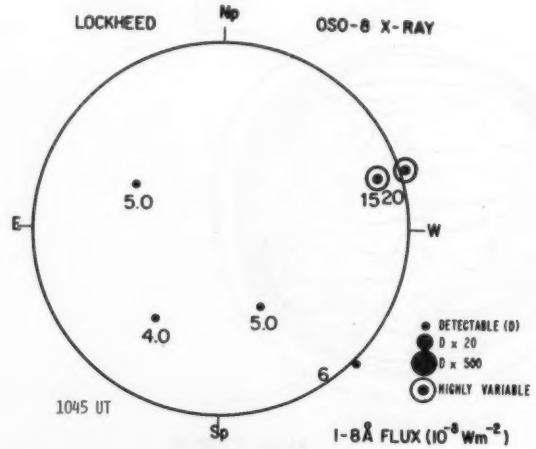

NOSC LA POSTA
2.0 CM
Np
E
W
Sp
1710 UT
Ant. Temp. Unit 100°K


NOSC LA POSTA
8.6 MM
Np
E
W
Sp
1604 UT
Ant. Temp. Unit 100°K

81
Jul 78

JULY 23, 1978 (P = 6.96, B_o = 5.06, L_o = 60.41)

LOCKHEED OSO-8 X-RAY

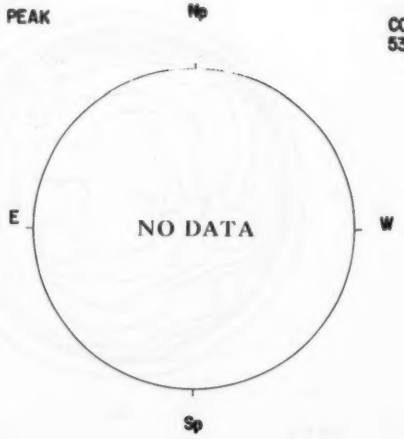


1045 UT

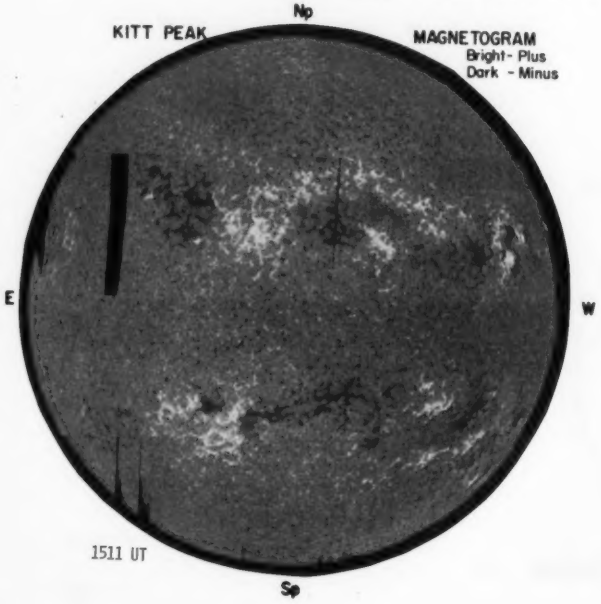
1-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



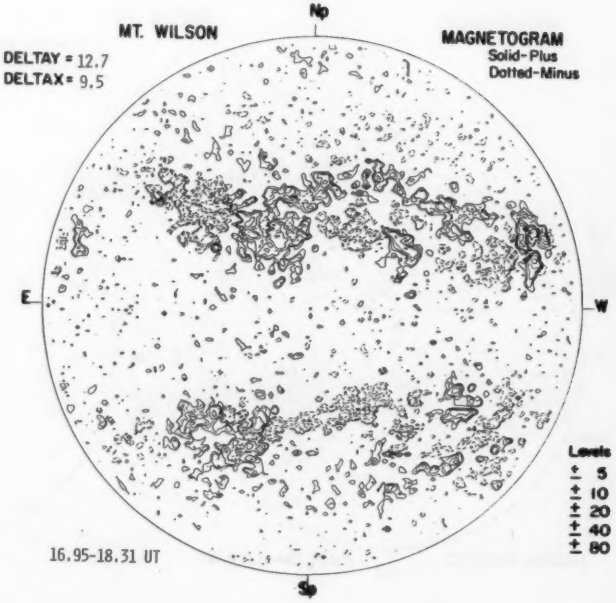
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1511 UT

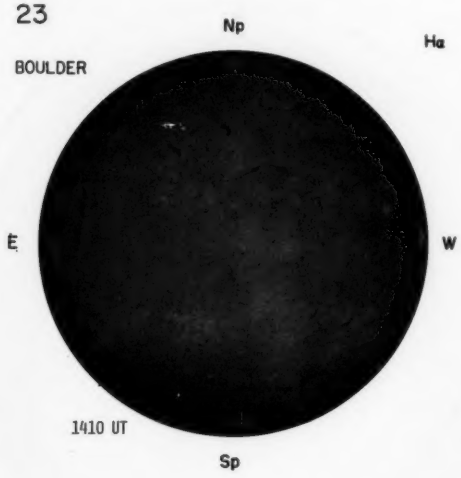
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY = 12.7
DELTAX = 9.5

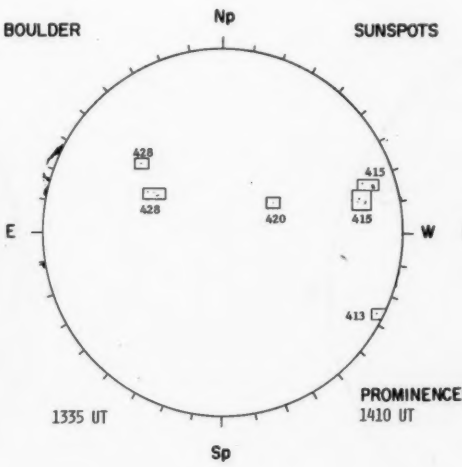


16.95-18.31 UT

23



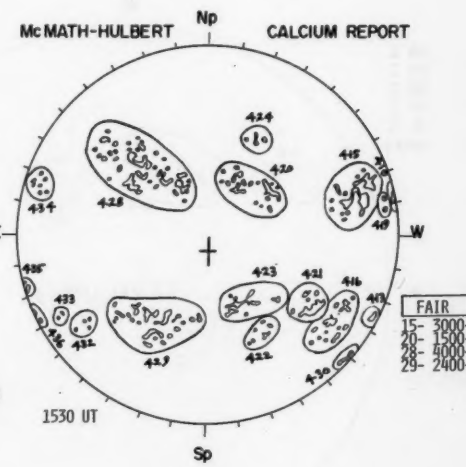
Hα BOULDER



SUNSPOTS

PROMINENCES
1410 UT

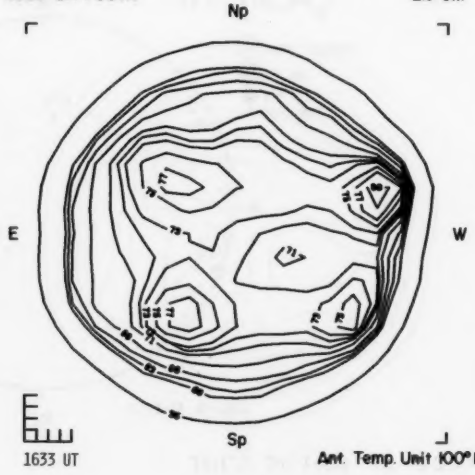
McMATH-HULBERT



CALCIUM REPORT

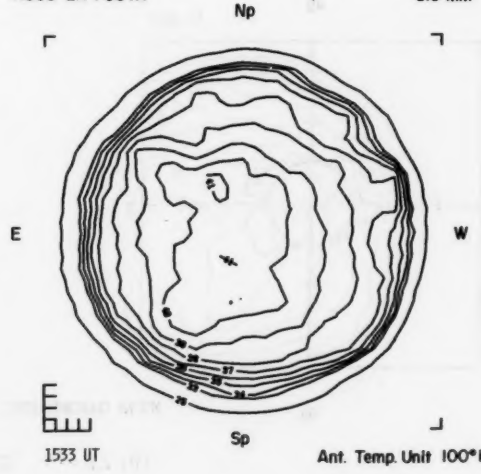
FAIR	S
15- 3000	4.0
20- 1500	2.5
28- 4000	3.0
29- 2400	2.5

NOSC LA POSTA 2.0 CM



Ant. Temp. Unit 100° K

NOSC LA POSTA 8.6 MM

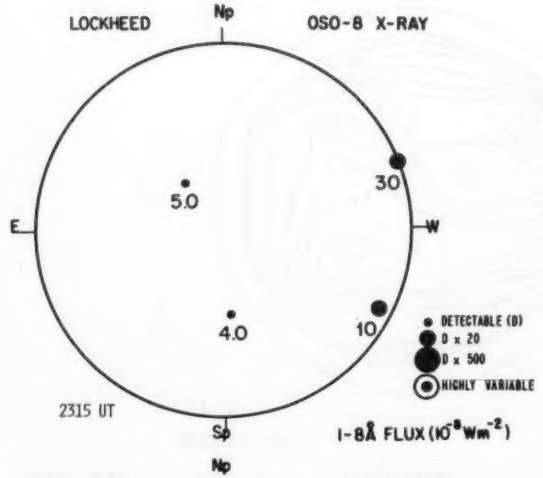


Ant. Temp. Unit 100° K

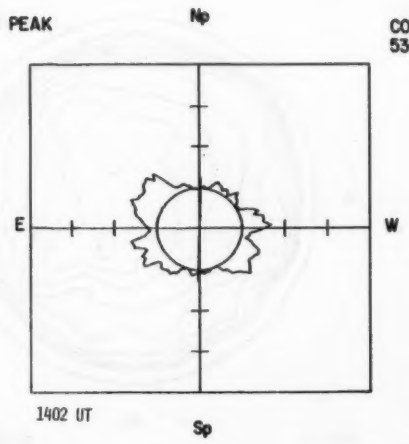
83
Jul 78

JULY 24, 1978 (P = 7.39, B_o = 5.15, L_o = 47.18)

LOCKHEED — OSO-8 X-RAY

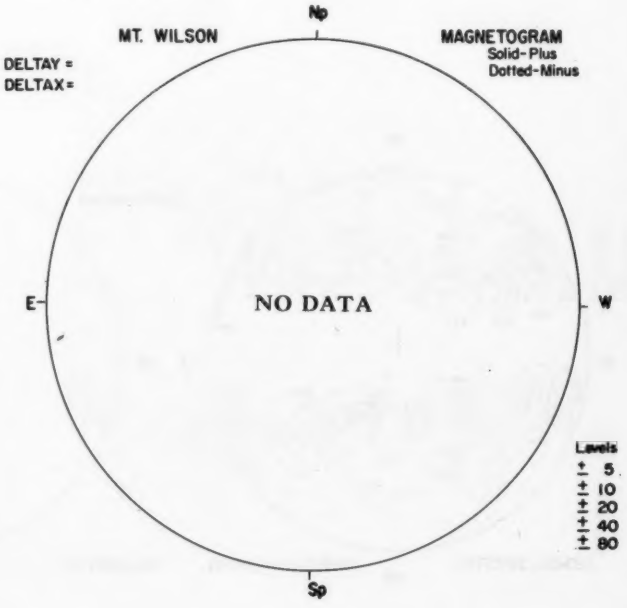


SACRAMENTO PEAK — CORONA (1.15 $R_\odot$) 5303 Å

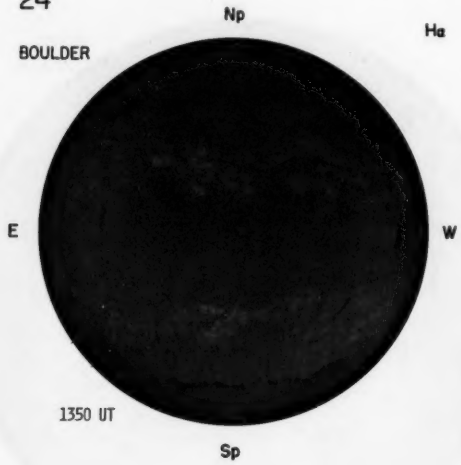


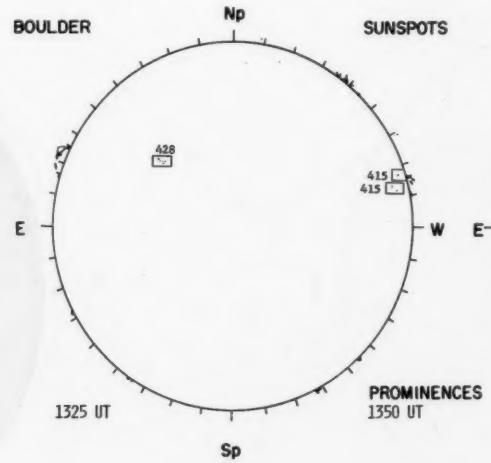
KITT PEAK — MAGNETOGRAM
Bright - Plus
Dark - Minus

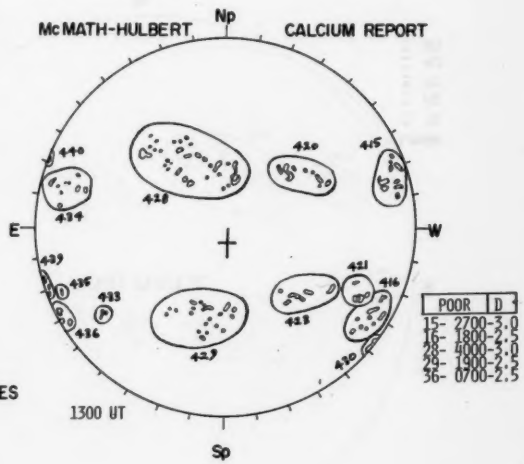
MT. WILSON — MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY =
DELTAX =

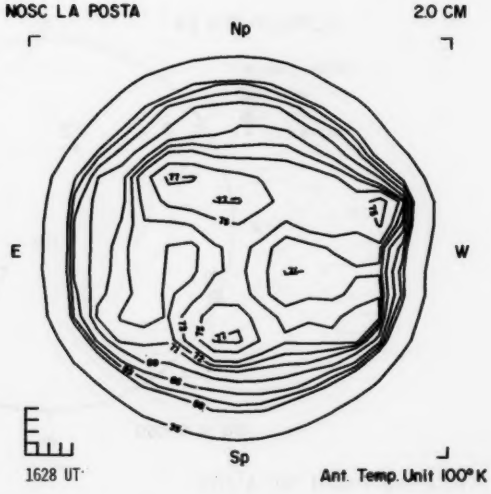


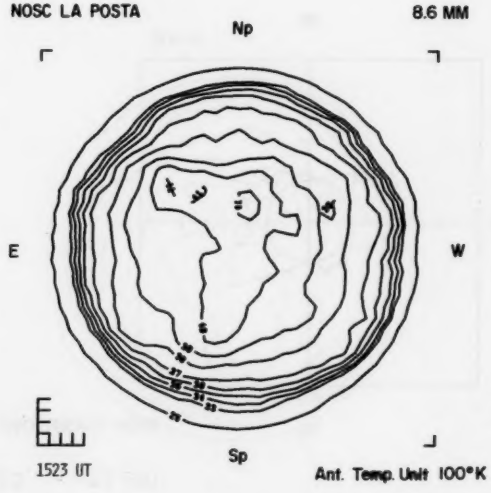
24


BOULDER
Np
E
W
Sp
1350 UT


Hα BOULDER
Np
E
W
Sp
1325 UT
428
415
415


SUNSPOTS
McMATH-HULBERT
Np
E
W
Sp
1300 UT
PROMINENCES
1350 UT
POOR
15- 2700-3.0
16- 1800-2.5
28- 4000-3.0
29- 1900-2.5
36- 0700-2.5

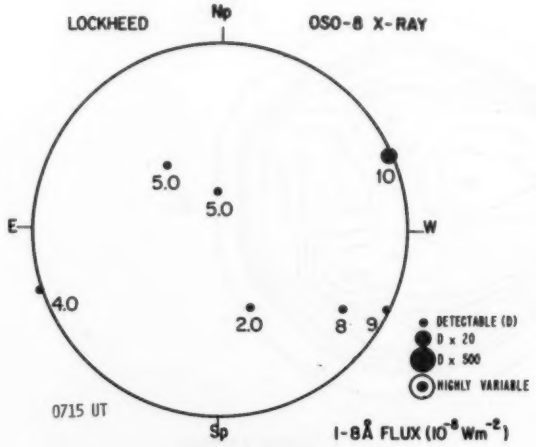

NOSC LA POSTA
2.0 CM
Np
E
W
Sp
1628 UT
Ant. Temp. Unit 100°K


NOSC LA POSTA
8.6 MM
Np
E
W
Sp
1523 UT
Ant. Temp. Unit 100°K

85
Jul 78

JULY 25, 1978 (P = 7.81, B_o = 5.23, L_o = 33.95)

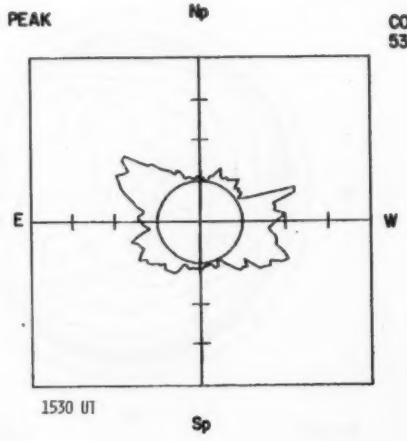
LOCKHEED OSO-8 X-RAY



0715 UT

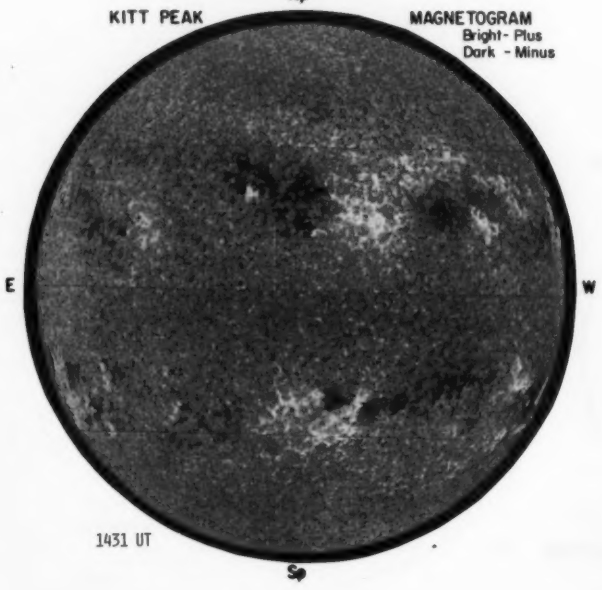
I-8Å FLUX (10^{-8} Wm^{-2})

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



1530 UT

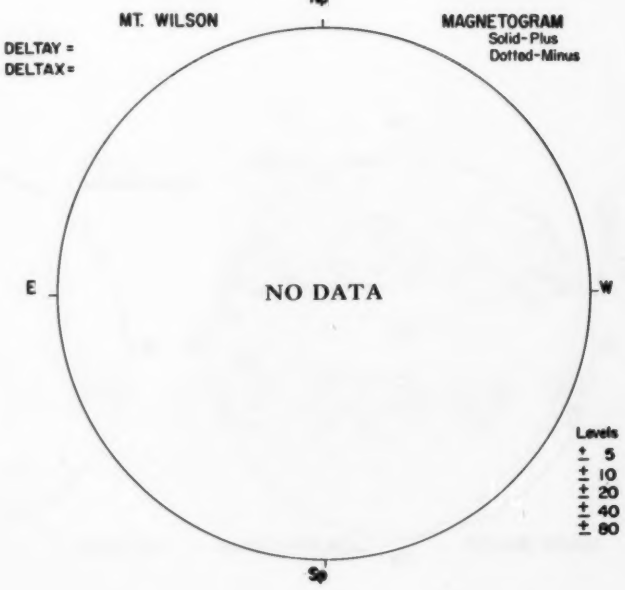
KITT PEAK MAGNETOGRAM Bright - Plus Dark - Minus



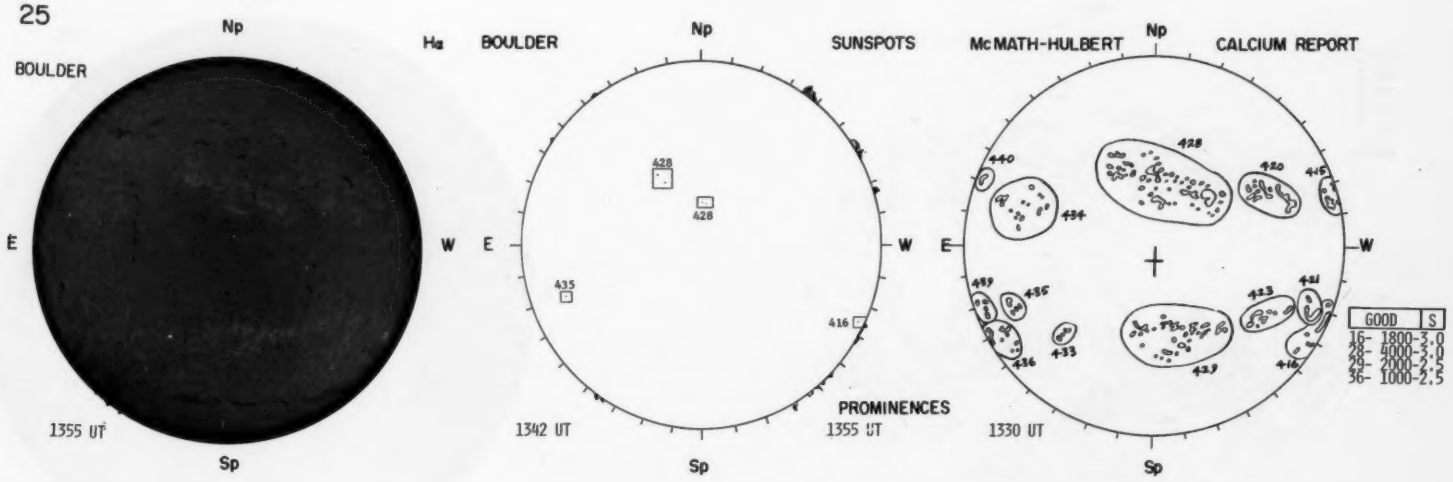
1431 UT

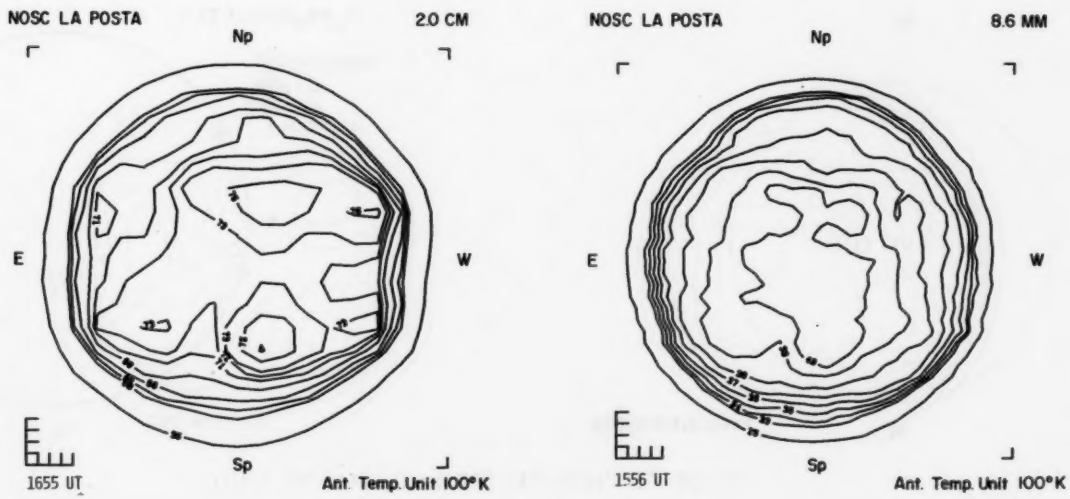
MT. WILSON MAGNETOGRAM Solid - Plus Dotted - Minus

DELTAY =
DELTAX =



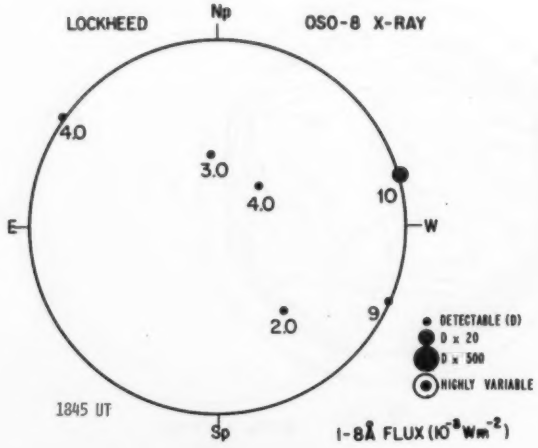
25


BOULDER
Np
Hα
E
W
Sp
1355 UT
BOULDER
SUNSPOTS
428
428
435
416
1342 UT
PROMINENCES
1355 UT
McMATH-HULBERT
CALCIUM REPORT
440
428
420
415
434
439
435
423
421
433
436
429
416
1330 UT
GOOD S
16- 1800-3.0
28- 4000-3.0
29- 2000-2.5
36- 1000-2.5


NOSC LA POSTA
2.0 CM
Np
E
W
Sp
1655 UT
Ant. Temp. Unit 100°K
NOSC LA POSTA
8.6 MM
Np
E
W
Sp
1556 UT
Ant. Temp. Unit 100°K

JULY 26, 1978 (P = 8.23, B_o = 5.31, L_o = 20.73)

LOCKHEED OSO-8 X-RAY

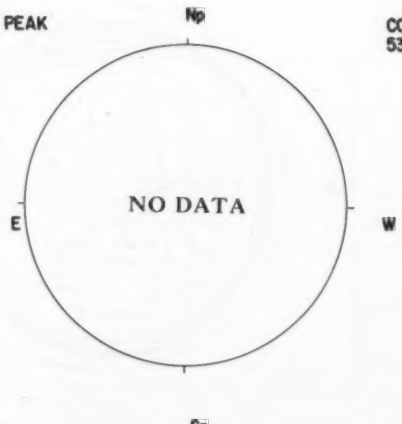


1845 UT

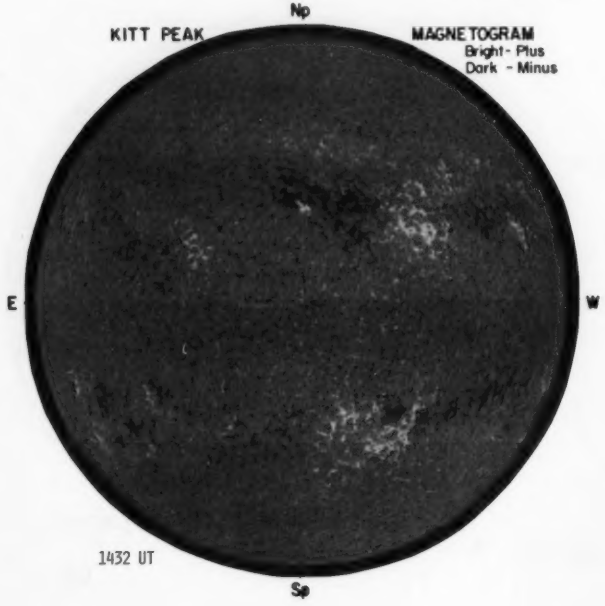
1-8Å FLUX (10^{-3} Wm^{-2})

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



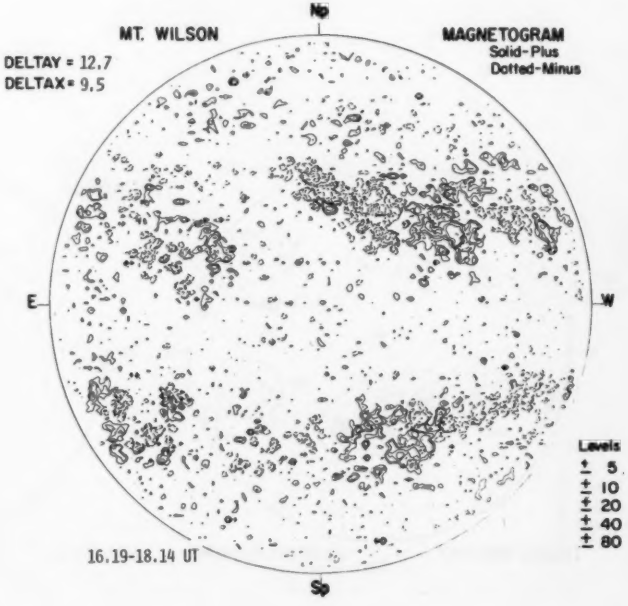
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1432 UT

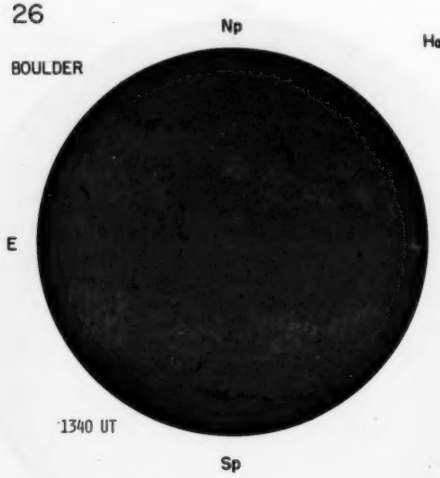
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

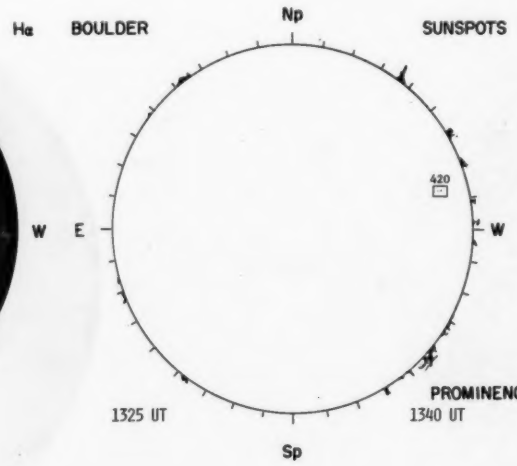
DELTAY = 12.7
DELTAX = 9.5



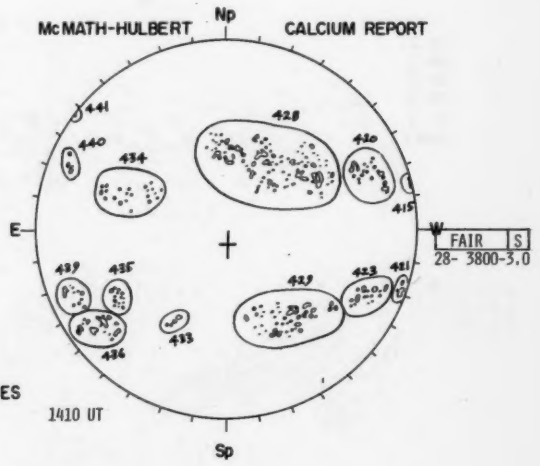
16.19-18.14 UT

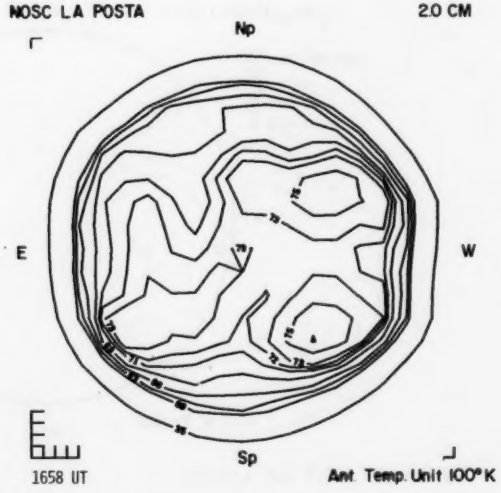
26

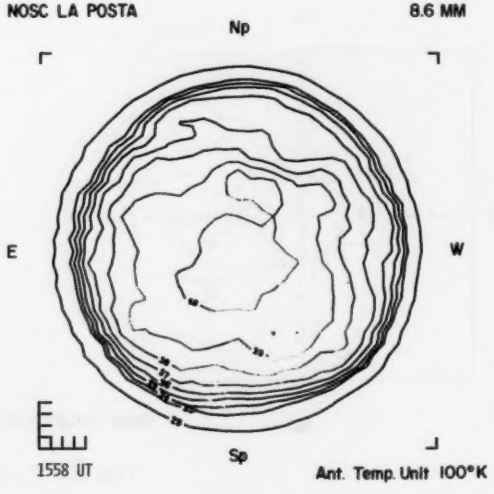

Np
BOULDER
E
W
1340 UT
Sp


Hα
BOULDER
Np
E
W
420
1325 UT
Sp

SUNSPOTS
Np
E
W
420
PROMINENCES
1340 UT
Sp


McMATH-HULBERT
CALCIUM REPORT
Np
E
W
441
440
434
428
430
415
439
435
436
433
429
423
431
FAIR
S
28- 3800-3.0
1410 UT
Sp

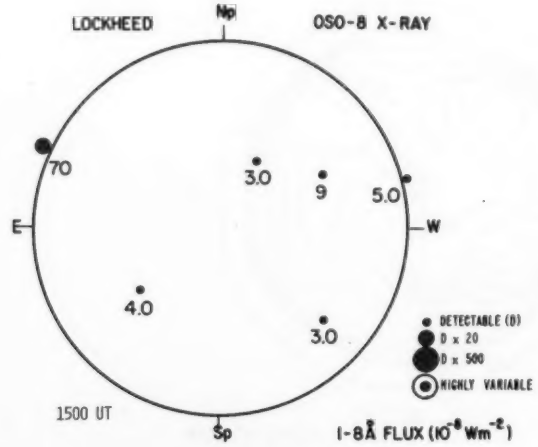

NOSC LA POSTA
2.0 CM
Np
E
W
Sp
1658 UT
Ant. Temp. Unit 100°K


NOSC LA POSTA
8.6 MM
Np
E
W
Sp
1558 UT
Ant. Temp. Unit 100°K

89
Jul 78

JULY 27, 1978 (P = 8.65, B_o = 5.39, L_o = 7.50)

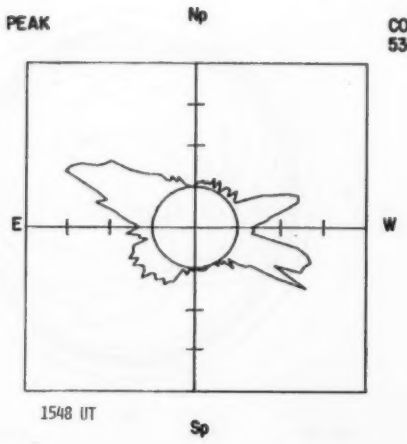
LOCKHEED OSO-8 X-RAY



1500 UT

1-8Å FLUX (10^{-8} Wm^{-2})

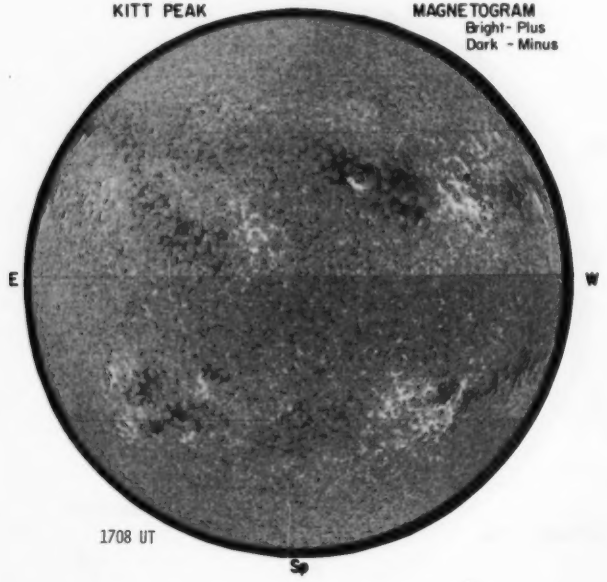
SACRAMENTO PEAK



1548 UT

KITT PEAK MAGNETOGRAM

Bright - Plus
Dark - Minus

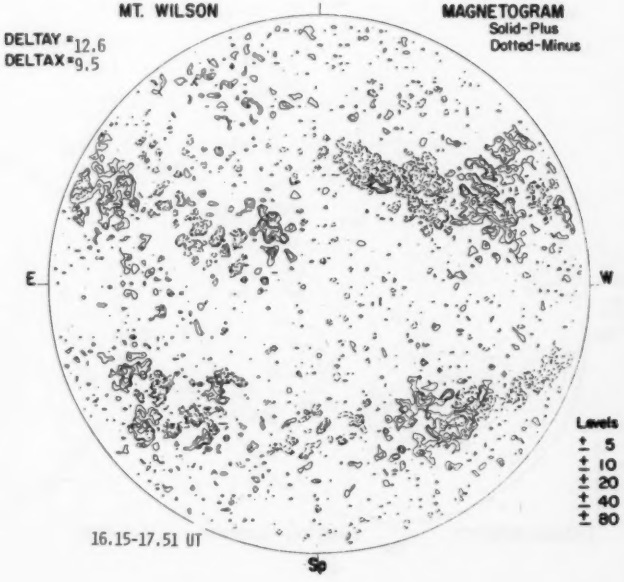


1708 UT

MT. WILSON MAGNETOGRAM

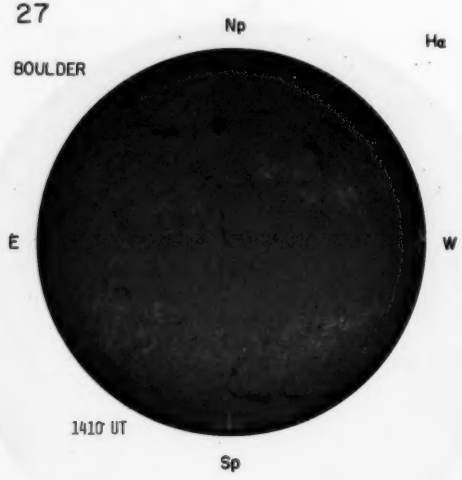
Solid - Plus
Dotted - Minus

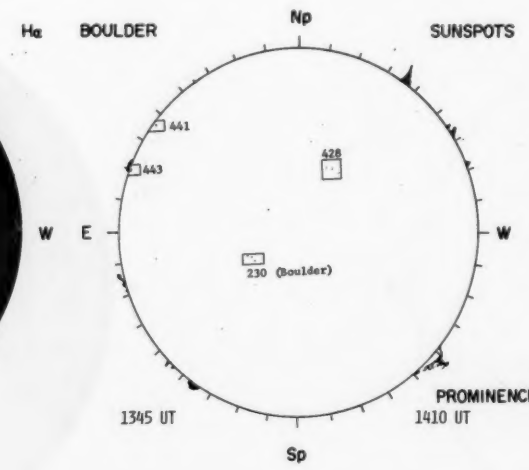
DELTAY = 12.6
DELTAX = 9.5

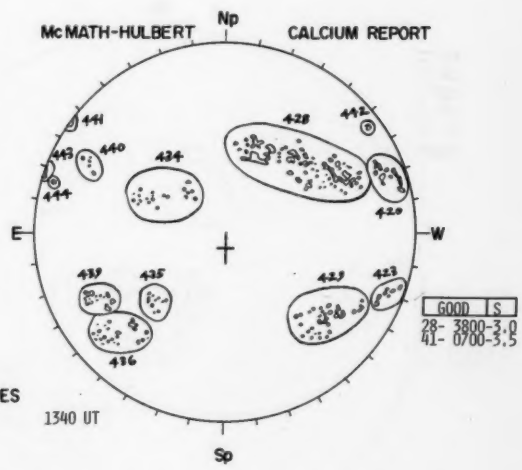


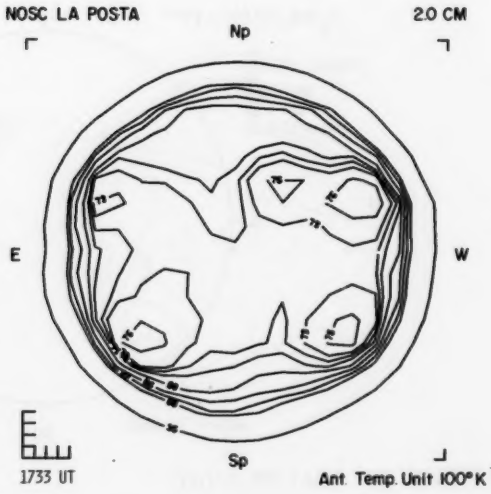
16.15-17.51 UT

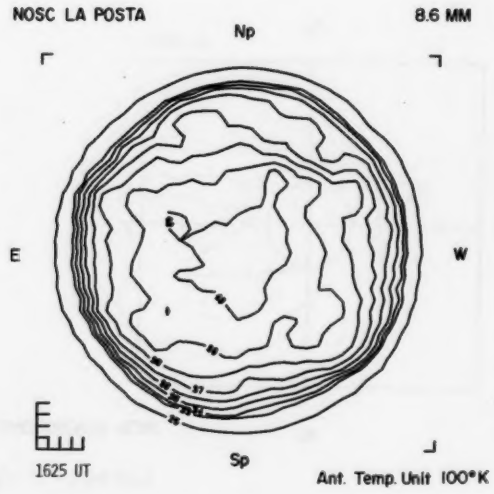
27


Np
BOULDER
E
W
1410 UT
Sp


Hα
BOULDER
Np
SUNSPOTS
441
443
428
230 (Boulder)
E
W
1345 UT
1410 UT
Sp
PROMINENCES


McMATH-HULBERT
Np
CALCIUM REPORT
441
428
442
443
440
434
444
420
439
435
423
436
E
W
Sp
GOOD | S
28- 3800-3.0
41- 0700-3.5

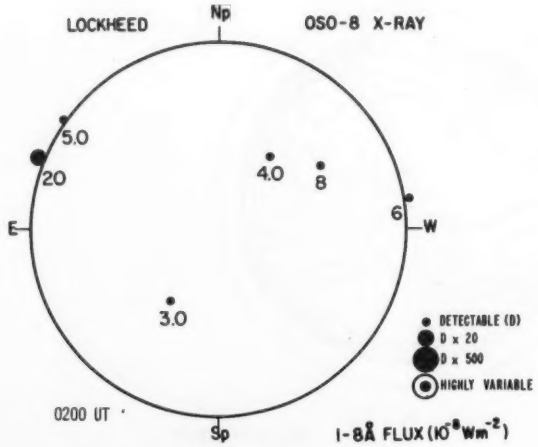

NOSC LA POSTA
2.0 CM
Np
E
W
1733 UT
Sp
Ant. Temp. Unit 100°K


NOSC LA POSTA
8.6 MM
Np
E
W
1625 UT
Sp
Ant. Temp. Unit 100°K

91
Jul 78

JULY 28, 1978 (P = 9.06, B_o = 5.47, L_o = 354.27)

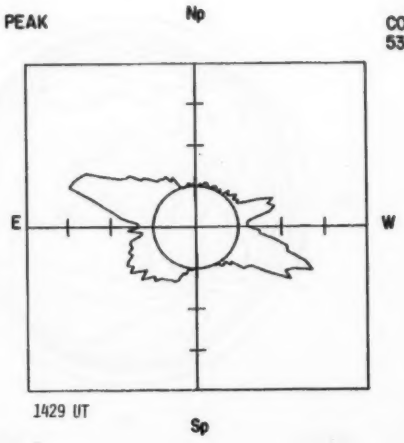
LOCKHEED OSO-8 X-RAY



0200 UT

1-8Å FLUX (10^{-8} Wm^{-2})

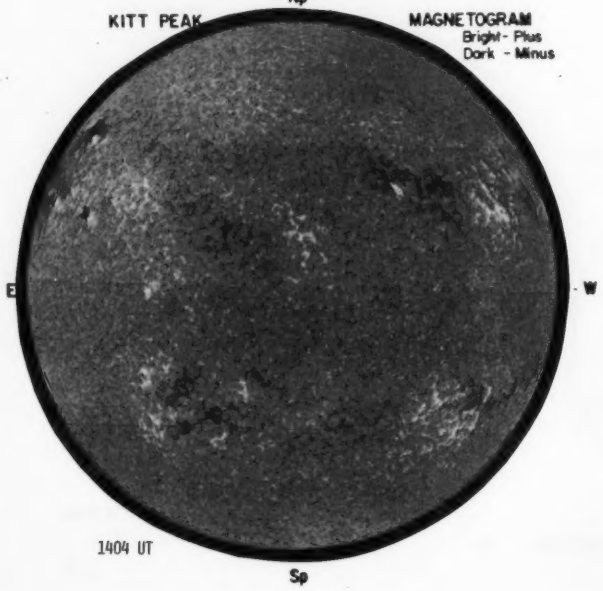
SACRAMENTO PEAK



CORONA (1.15 $R_\odot$)
5303 Å

1429 UT

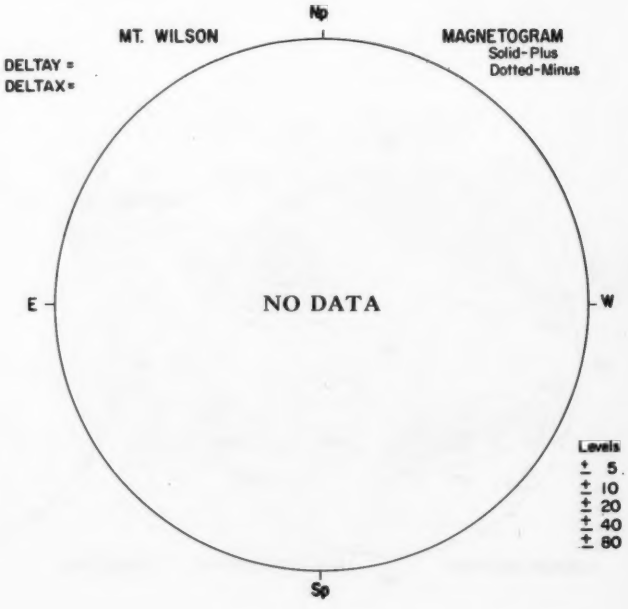
KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



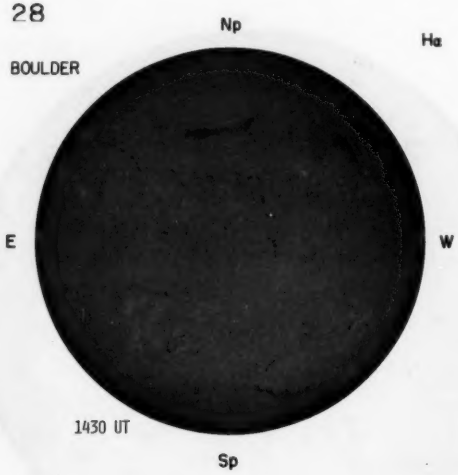
1404 UT

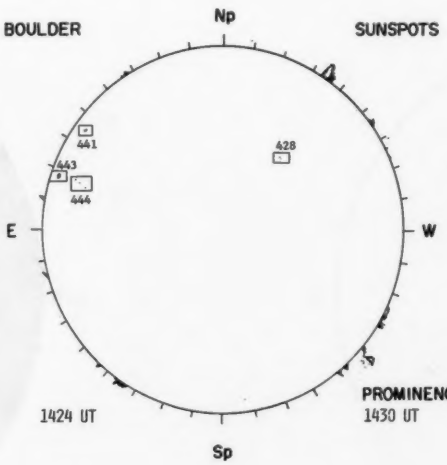
MT. WILSON MAGNETOGRAM
Solid-Plus
Dotted-Minus

DELTAY =
DELTAX =

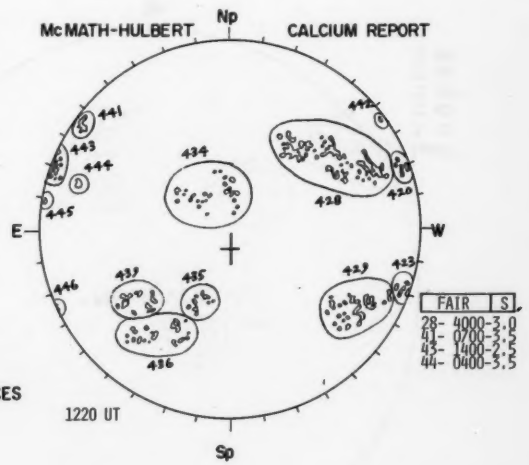


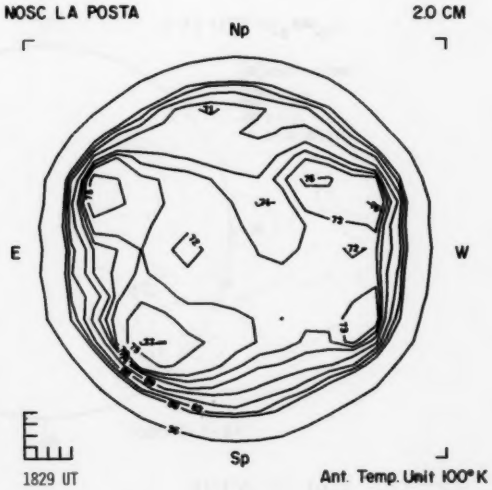
28

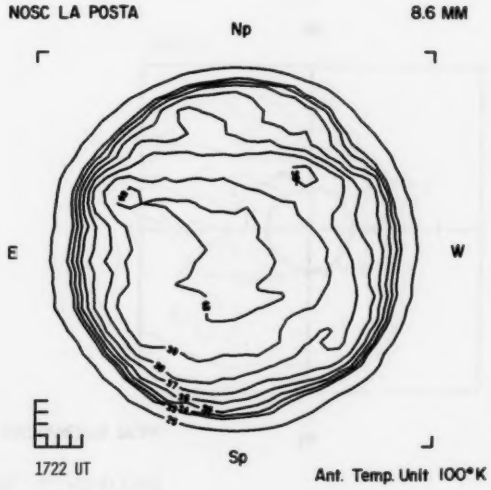

Np
BOULDER
E
W
Sp
1430 UT


Hα BOULDER
Np
E
W
Sp
1424 UT

SUNSPOTS
Np
E
W
Sp
PROMINENCES
1430 UT

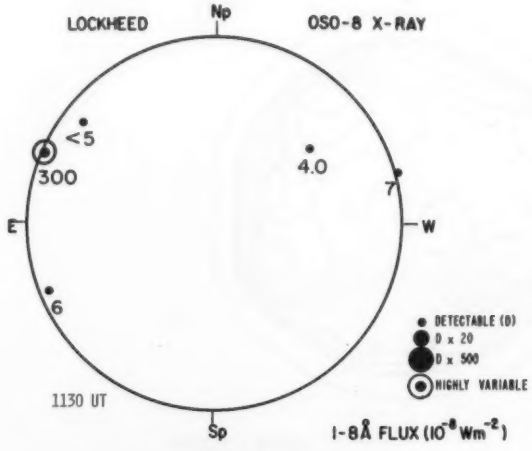

McMATH-HULBERT
CALCIUM REPORT
Np
E
W
Sp
1220 UT
FAIR S
28- 4000-3.0
41- 0700-3.5
43- 1400-2.5
44- 0400-3.5


NOSC LA POSTA
2.0 CM
Np
E
W
Sp
1829 UT
Ant. Temp. Unit 100°K

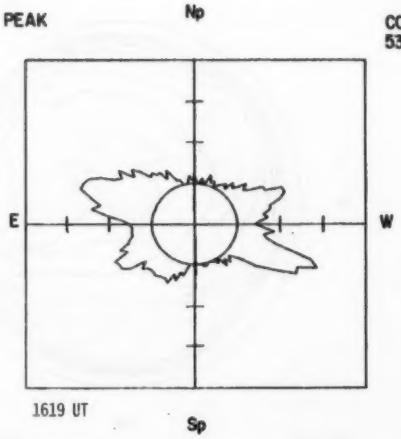

NOSC LA POSTA
8.6 MM
Np
E
W
Sp
1722 UT
Ant. Temp. Unit 100°K

JULY 29, 1978 (P = 9.47, B_o = 5.55, L_o = 341.04)

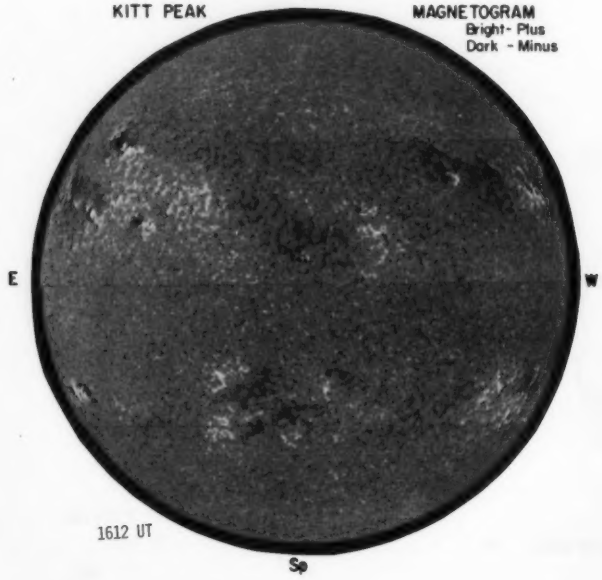
LOCKHEED OSO-8 X-RAY



SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

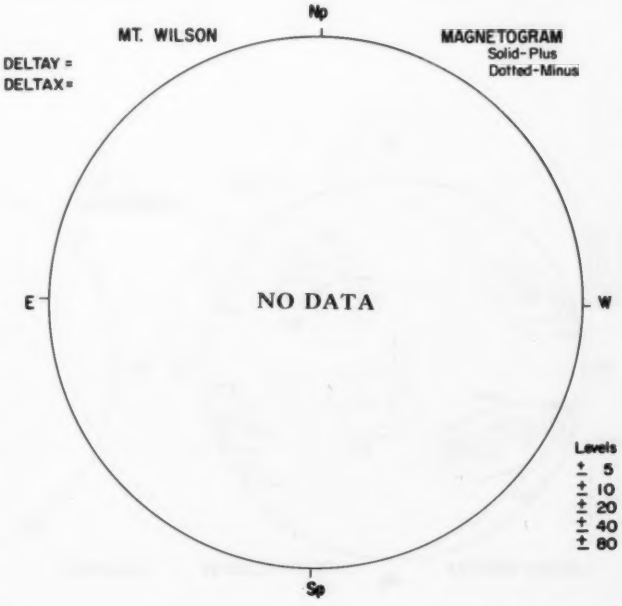


KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus

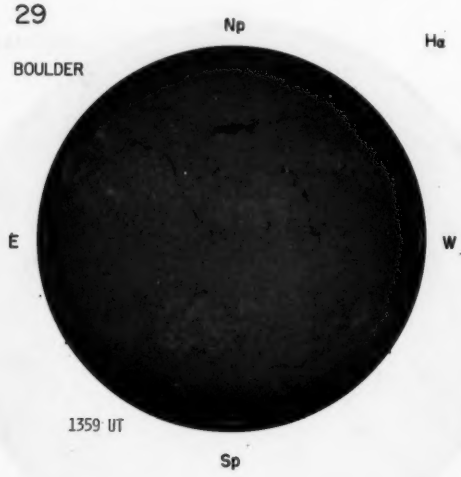


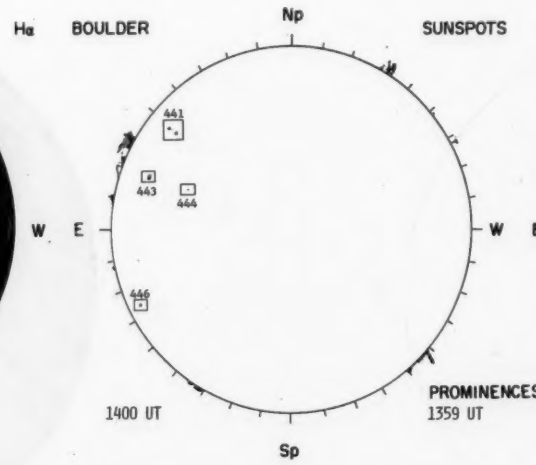
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

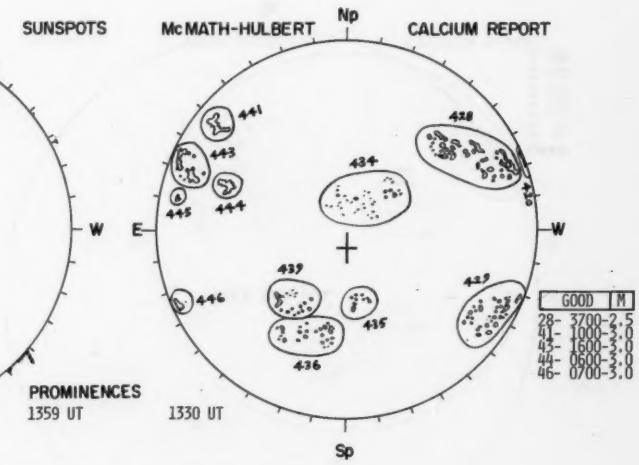
DELTAY =
DELTAX =



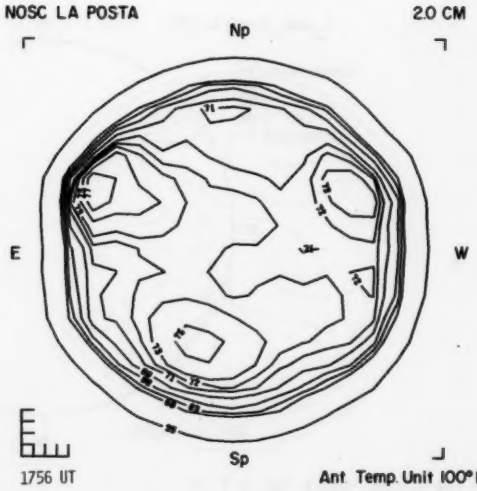
29

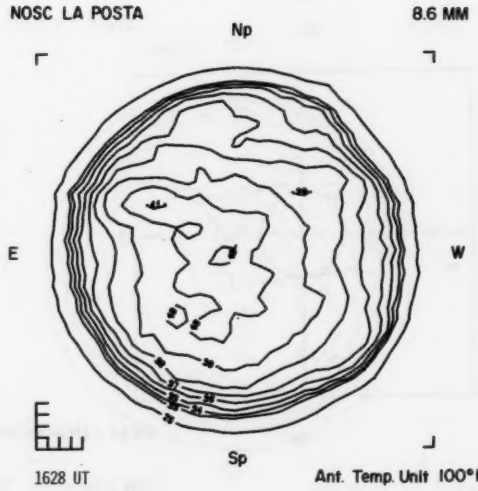

Np
BOULDER
E
W
Sp
1359 UT


Hα
BOULDER
Np
441
443
444
446
E
W
Sp
1400 UT


SUNSPOTS
Np
E
W
Sp
PROMINENCES
1359 UT

McMATH-HULBERT
CALCIUM REPORT
Np
441
428
443
434
445
444
439
446
435
436
429
E
W
Sp
1330 UT
GOOD | M
28- 3700-2.5
41- 1000-3.0
43- 1600-3.0
44- 0600-3.0
46- 0700-3.0

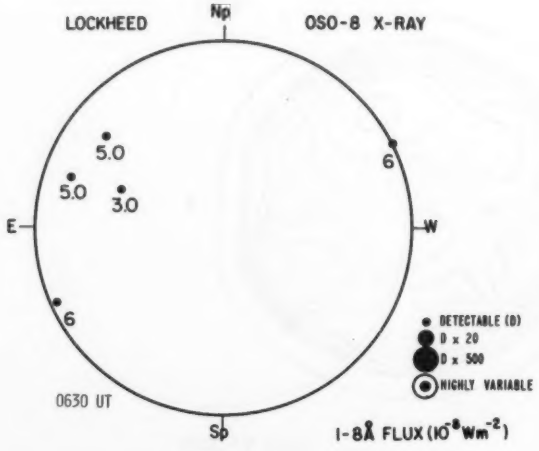

NOSC LA POSTA
2.0 CM
Np
E
W
Sp
1756 UT
Ant. Temp. Unit 100°K


NOSC LA POSTA
8.6 MM
Np
E
W
Sp
1628 UT
Ant. Temp. Unit 100°K

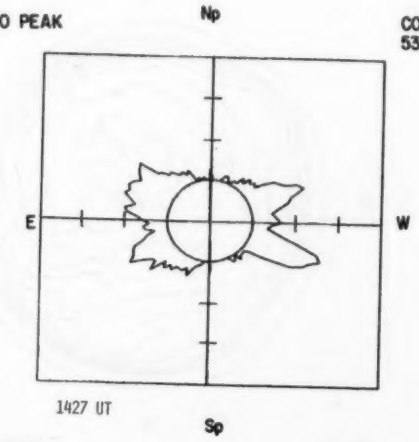
95
Jul 78

JULY 30, 1978 (P = 9.88, B_o = 5.63, L_o = 327.82)

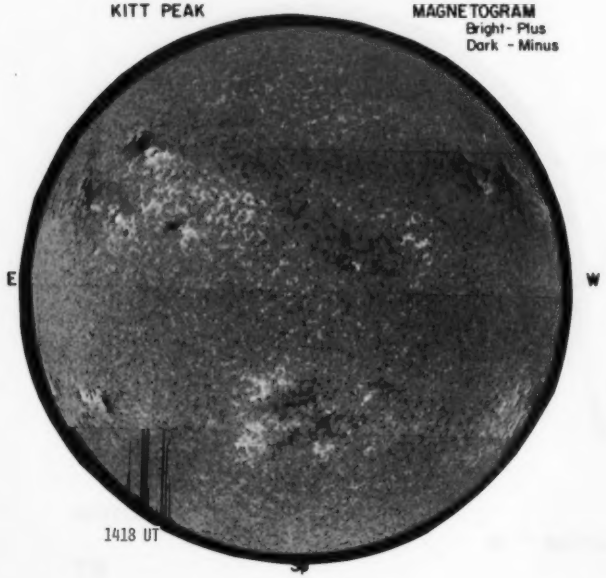
LOCKHEED OSO-8 X-RAY



SACRAMENTO PEAK

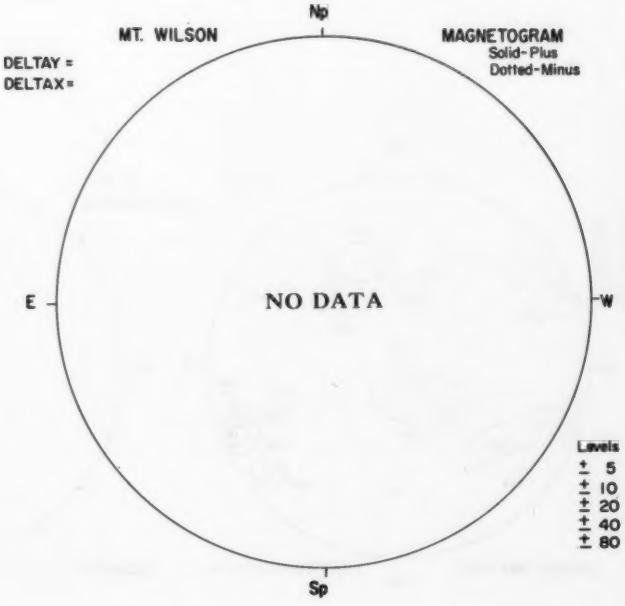


KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



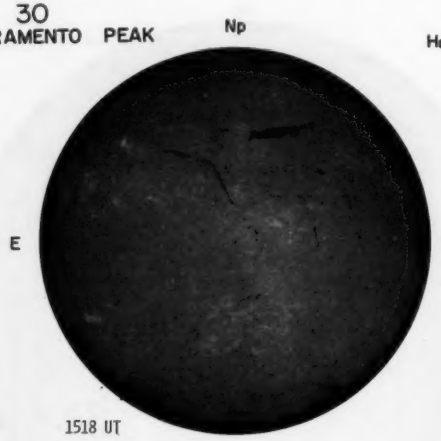
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =



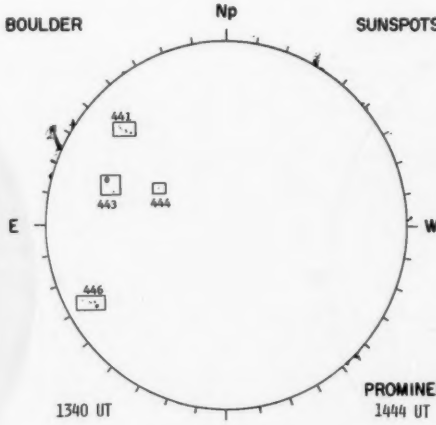
30

SACRAMENTO PEAK



1518 UT

BOULDER



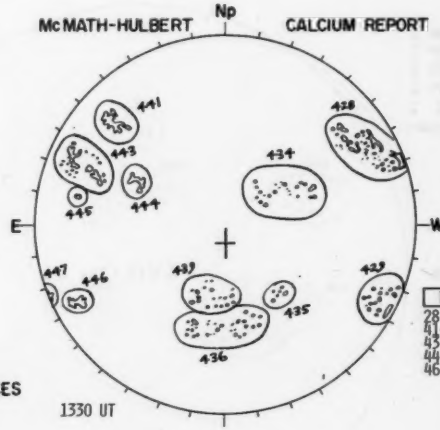
1340 UT

PROMINENCES

1444 UT

McMATH-HULBERT

CALCIUM REPORT

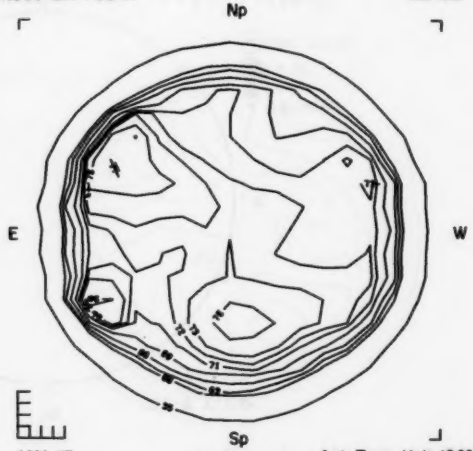


1330 UT

POOR	M
28-	3700-2.5
41-	1400-3.0
43-	1400-2.5
44-	0600-2.5
46-	0800-3.0

NOSC LA POSTA

2.0 CM

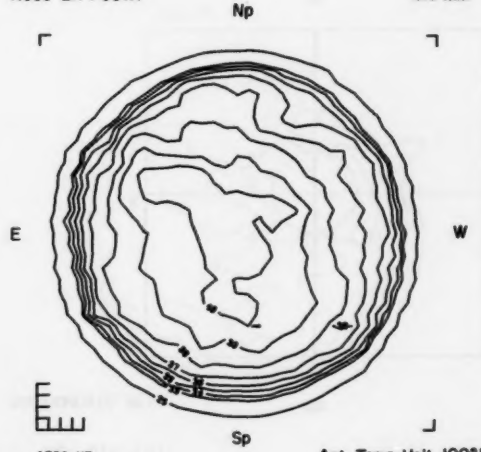


1629 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM



1528 UT

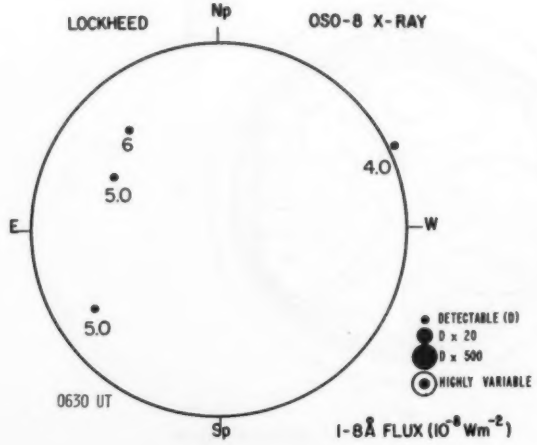
Ant. Temp. Unit 100°K

97

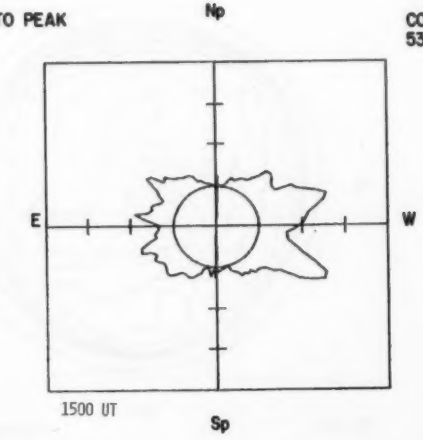
Jul 78

JULY 31, 1978 (P=10.29, B_o=5.71, L_o=314.59)

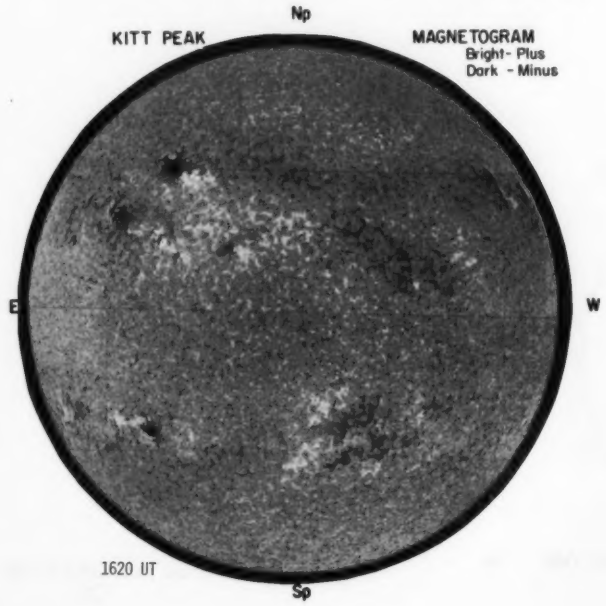
LOCKHEED OSO-8 X-RAY



SACRAMENTO PEAK

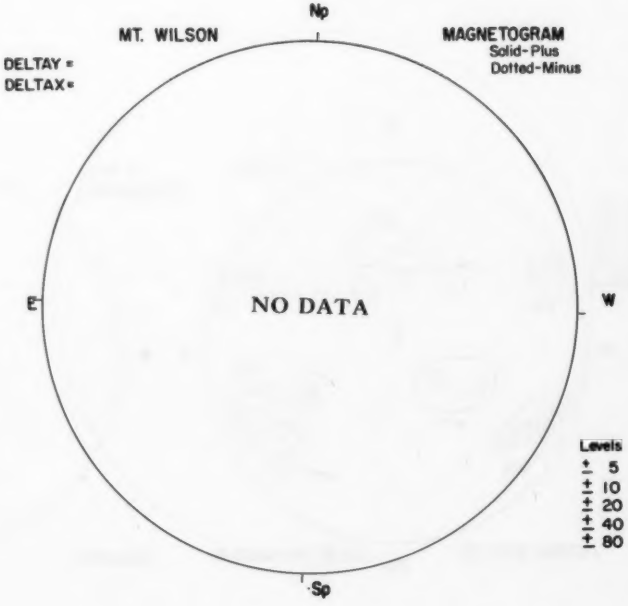


KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



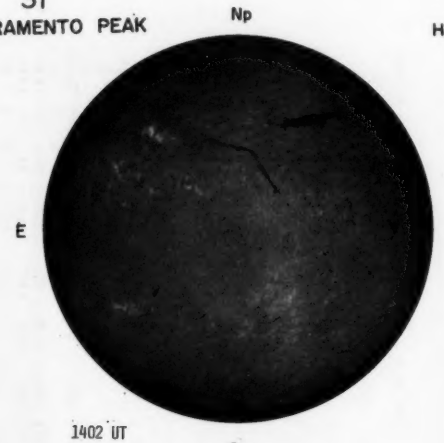
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =



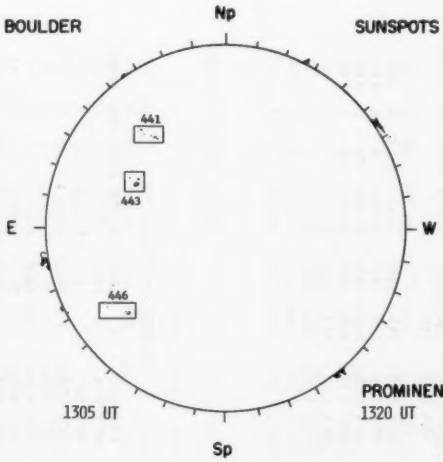
31

SACRAMENTO PEAK



1402 UT

Hα BOULDER



1305 UT

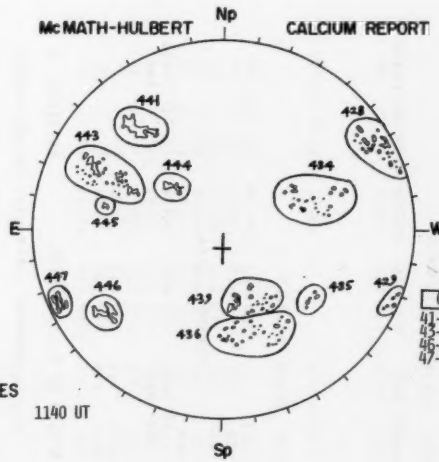
SUNSPOTS

PROMINENCES

1320 UT

McMATH-HULBERT

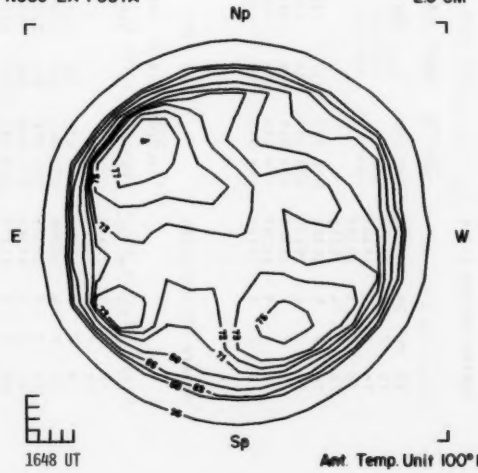
CALCIUM REPORT



1140 UT

GOOD	D
41- 1800-3.0	
43- 1300-2.5	
46- 1200-3.0	
47- 1000-2.5	

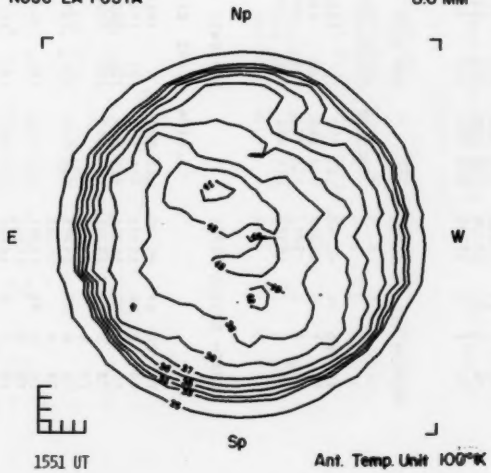
NOSC LA POSTA 2.0 CM



1648 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



1551 UT

Ant. Temp. Unit 100°K

99

Jul 78

REGIONS OF SOLAR ACTIVITY

JULY 1978

MCMATH REGION 15380 CMP DATE 1.3

CALCIUM					PLAGE DATA			SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	6	26	15380	N30 E63	350	300	2.0									
78	6	27	15380	N31 E50	350	200	2.5									
78	6	28	15380	N32 E36	351	400	3.0									
78	6	29	15380	N32 E23	351	300	2.5									
78	6	30	15380	N32 E10	350	300	2.5									
78	7	5	15380	N32 W56	348	100	1.0									

MCMATH REGION 15387 CMP DATE 2.0

CALCIUM					PLAGE DATA			SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	5	15387	N11 W46	338	400	3.0		N09 W44				B	10	5	BXO
78	7	6	15387	N11 W59	338	400	2.0									
78	7	7	15387	N11 W72	337	400	1.5									

MCMATH REGION 15381 CMP DATE 2.3 RETURN OF REGION 15355 ROTATION 2

CALCIUM					PLAGE DATA			SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	6	26	15381	N14 E82	331	1700	3.5	20102	N16 E78	129	B	2				
78	6	27	15381	N15 E69	331	3000	3.5									
78	6	28	15381	N15 E50	337	2800	3.5	20102	N16 E43	342	(BP)	3	B	60	5	CSO
78	6		15381					20104	N19 E50	335	(AP)	1	B	0	1	AXX
78	6	29	15381	N17 E38	336	3000	3.5	20102	N17 E26	346	(BP)	3	B	20	8	BXI
78	6		15381					20104	N19 E37	335	(AP)	2	B	10	1	AXX
78	6	30	15381	N17 E24	336	3400	3.0	20102	N16 E12	347	(AP)	3				
78	6		15381					20104	N19 E25	334	(AP)	1				
78	7	5	15381	N17 W43	335	2400	2.5		N16 W51				B	0	2	BXO
78	7	6	15381	N17 W56	335	2000	2.0									
78	7	7	15381	N17 W70	335	1500	1.5									
78	7	8	15381	N17 W82	334	900	1.5									

MCMATH REGION 15388 CMP DATE 2.9

CALCIUM					PLAGE DATA			SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	1	15388					20108	N27 E11		(AP)	1				
78	7	2	15388					20108	N26 E03		(B)	3				
78	7	3	15388					20108	N26 W11		(B)	4				
78	7	4	15388					20108	N26 W24		(B)	4				
78	7	5	15388	N27 W35	327	700	3.5	20108	N26 W36		(B)	3				
78	7	6	15388	N28 W47	326	700	3.0	20108	N27 W50		(B)	4				
78	7	7	15388	N28 W60	325	900	2.5	20108	N28 W62		(B)	3				
78	7	8	15388	N28 W74	326	900	2.5		N28 W76				B	10	1	AXX
78	7	9	15388	N28 W87	326	400	1.0									

MCMATH REGION 15389 CMP DATE 3.2

CALCIUM					PLAGE DATA			SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	3	15389					20111	S24 W07	323	(AP)	3				
78	7	4	15389					20111	S26 W19	322	(BY)	4				
78	7	5	15389	S26 W31	323	1100	4.5	20111	S26 W32	323	(BY)	4	B	100	15	DSI
78	7	6	15389	S25 W44	323	1200	3.5	20111	S26 W45	322	(D)	4	B	130	18	DAI
78	7	7	15389	S25 W56	321	1200	3.5	20111	S26 W58	321	(BP)	3	B	900	12	CSI
78	7	8	15389	S26 W68	320	1800	3.5	20111	S26 W70	320	(B)	2	B	90	9	ERO
78	7	9	15389	S27 W81	320	1800	2.5		S25 W75				H	20	2	BXO

MCMATH REGION 15382 CMP DATE 3.4

CALCIUM					PLAGE DATA			SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	6	27	15382	N22 E85	315	500	2.5									
78	6	28	15382	N23 E68	319	600	3.5	20105	N22 E66	319	AF	1	B	10	1	AXX
78	6	29	15382	N23 E53	321	500	2.5	20105	N23 E52	320	(AF)	1	B	10	2	AXX
78	6	30	15382	N23 E39	321	600	2.0									
78	7	5	15382	N23 W28	320	300	2.0									

CONTD

REGIONS OF SOLAR ACTIVITY

JULY 1978

MCMATH REGION 15382 (CONT) CMP DATE 3.4

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	6	15382	N23 W40	319	300	2.0									

MCMATH REGION 15384 CMP DATE 3.7 RETURN OF REGION 15349 ROTATION 2

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	6	27	15384	S14 E46	314	400	2.0									
78	6	28	15384	S16 E70	317	600	3.5	20106	S15 E66	319	B	1	B	0	1	AXX
78	6	29	15384	S16 E57	317	800	3.5	20106	S15 E53	319	(B)	3	B	20	6	BXI
78	6	30	15384	S16 E43	317	900	3.5	20106	S16 E43	316	(AF)	3				
78	7	5	15384	S15 W24	316	500	2.0									
78	7	6	15384	S15 W37	316	500	2.0									
78	7	7	15384	S15 W50	315	600	3.0	20120	S16 W48	311	(BF)	3	B	10	3	BXO
78	7	8	15384	S15 W63	315	1000	3.5	20120	S15 W63	313	(B)	3	B	50	7	DRO
78	7	9	15384	S15 W76	315	1000	2.5	20120	S15 W75	311	B	1	H	60	4	DRO
78	7	10	15384	S15 W85	311	200	1.0									

MCMATH REGION 15390 CMP DATE 4.5

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	6	30	15390	N23 E53	307	300	2.0									
78	7	3	15390					20112	N22 E15		(AP)	3				
78	7	5	15390	N23 W13	305	500	2.5	20112	N20 W14		(AP)	3				
78	7	6	15390	N23 W25	304	500	2.0									
78	7	7	15390	N23 W37	302	700	2.0	20121	N17 W37	300	(AP)	4	B	10	1	AXX
78	7	8	15390	N23 W50	302	700	2.5	20121	N18 W49	299	(B)	2	B	10	3	CRO
78	7	9	15390	N21 W64	303	600	2.0									
78	7	10	15390	N21 W75	301	600	1.0									

MCMATH REGION 15386 CMP DATE 5.4

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	6	30	15386	S21 E66	294	400	2.5									
78	7	1	15386					20109	S19 E46		(AP)	3				
78	7	2	15386					20109	S19 E36		(AP)	3				
78	7	3	15386					20113	S20 E22		(AP)	3				
78	7	5	15386	S20 W01	293	400	2.5									
78	7	6	15386	S20 W13	292	300	2.5									
78	7	7	15386	S20 W26	291	300	2.0									
78	7	8	15386	S20 W39	291	300	1.5									
78	7	9	15386	S20 W52	291	200	1.0									
78	7	10	15386	S20 W65	291	300	1.5									

MCMATH REGION 15407 CMP DATE 5.4

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	10	15407	N34 W67	293	700	2.0									
78	7	11	15407	N34 W80	293	300	2.0									

MCMATH REGION 15385 CMP DATE 6.4

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	6	29	15385	N18 E89	285	700	2.0	20107	N19 E85	287	AP	3	B	40	1	HSX
78	6	30	15385	N20 E78	282	1600	3.5	20107	N19 E75	284	(B)	4				
78	7	1	15385					20107	N19 E56	283	(BP)	4				
78	7	2	15385					20107	N19 E47	282	(BP)	4				
78	7		15385					20110	N34 E36		(AP)	1				
78	7	3	15385					20107	N19 E34	282	(BY)	4				
78	7	4	15385					20107	N19 E19	284	(AP)	4				
78	7	5	15385	N20 E11	281	3000	3.0	20107	N18 E07	284	(AP)	4	B	100	1	HSX
78	7		15385					20115	N20 E26	265	(AF)	1				
78	7	6	15385	N20 W02	281	2700	3.0	20107	N19 W07	284	(BP)	4	B	130	5	CSO
78	7	7	15385	N20 W15	280	2400	2.5	20107	N20 W20	283	(AP)	5	B	100	5	CSO
78	7	8	15385	N20 W28	280	2400	2.5	20107	N20 W33	283	(AP)	4	B	100	3	HAX

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MCMATH REGION 15385 (CONT) CMP DATE 6.4

				CALCIUM			PLAGE	DATA			SUNSPOT	DATA					
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	9	15385	N20 W41	280	1700	2.5	20107	N20 W46	282	(AP)	5	H	100	1	HSX
78	7	10	15385	N20 W53	279	1600	2.5	20107	N20 W59	283	(AP)	4	B	60	1	HSX
78	7	11	15385	N20 W66	279	1600	2.0	20107	N19 W72	282	(AP)	3	B	50	1	HRX
78	7	12	15385	N20 W80	279	1700	1.5									

MCMATH REGION 15408 CMP DATE 6.7

				CALCIUM			PLAGE	DATA			SUNSPOT	DATA					
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	10	15408	N11 W50	276	300	1.5									
78	7	11	15408	N11 W64	277	100	1.0									
78	7	12	15408	N11 W78	277	200	1.0									

MCMATH REGION 15412 CMP DATE 7.4

				CALCIUM			PLAGE	DATA			SUNSPOT	DATA					
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	12	15412	N33 W67	266	300	1.5									

MCMATH REGION 15409 CMP DATE 7.5

				CALCIUM			PLAGE	DATA			SUNSPOT	DATA					
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	10	15409	N20 W40	266	400	2.5	20128	N21 W41	265	(BF)	3	B	30	6	BXO
78	7	11	15409	N20 W53	266	1000	3.0	20128	N20 W57	267	(BF)	3	B	170	10	CRO
78	7	12	15409	N20 W67	266	1400	3.5	20128	N20 W70	267	(B)	4	B	200	13	CAO
78	7	13	15409	N20 W80	265	1300	3.0		N21 W76				B	180	5	HKX

MCMATH REGION 15396 CMP DATE 7.9

				CALCIUM			PLAGE	DATA			SUNSPOT	DATA					
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	6	15396	S11 E19	260	100	2.5		S11 E17				B	0	1	AXX

MCMATH REGION 15405 CMP DATE 8.0

				CALCIUM			PLAGE	DATA			SUNSPOT	DATA					
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	9	15405	S30 W19	258	200	2.5	20124	S30 W20	256	(B)	2				
78	7	10	15405	S30 W31	257	300	2.5	20124	S30 W34	258	(B)	2	B	10	3	BXO
78	7	11	15405	S30 W44	257	200	2.0									
78	7	12	15405	S30 W56	255	200	1.0									
78	7	13	15405	S30 W70	255	100	1.0									

MCMATH REGION 15395 CMP DATE 8.1

				CALCIUM			PLAGE	DATA			SUNSPOT	DATA					
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	6	15395	N12 E21	258	200	1.5									
78	7	7	15395	N12 E08	257	100	1.5									
78	7	8	15395	N12 W06	258	100	1.5									
78	7	9	15395	N12 W19	258	100	1.0									
78	7	10	15395	N12 W32	258	100	2.0									

MCMATH REGION 15391 CMP DATE 8.5 RETURN OF REGION 15345 ROTATION 3

				CALCIUM			PLAGE	DATA			SUNSPOT	DATA					
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	5	15391	S22 E35	257	1400	2.0									
78	7	6	15391	S23 E22	257	1100	2.0	20116	S25 E19	258	(B)	2	B	0	1	AXX
78	7		15391					20117	S20 E25	252	(AF)	1				
78	7	7	15391	S23 E13	252	1000	1.5	20116	S24 E04	259	(AP)	2	B	0	2	AXX

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MCMATH REGION 15391 (CONT) CMP DATE 8.5 RETURN OF REGION 15345 ROTATION 3

CALCIUM PLAGE DATA — SUNSPOT DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	8	15391	S23 W01	253	1000	1.5									
78	7	9	15391	S23 W12	251	800	1.5	20125	S20 W16	252	(B)	2				
78	7	10	15391	S23 W30	256	800	1.5									
78	7	11	15391	S23 W44	257	700	2.0		S21 W43				B	0	1	AXX
78	7	12	15391	S23 W56	255	800	2.0	20132	S20 W56	253	(AF)	2	B	0	1	AXX
78	7	13	15391	S20 W70	255	400	2.0									
78	7	14	15391	S20 W82	255	300	1.0									

MCMATH REGION 15392 CMP DATE 9.3 RETURN OF REGION 15352 ROTATION 2

CALCIUM PLAGE DATA — SUNSPOT DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	4	15392					20114	N16 E61		(AF)	1				
78	7	5	15392	N17 E47	245	1200	2.5									
78	7	6	15392	N17 E35	244	1200	2.5									
78	7	7	15392	N17 E23	242	1000	2.5									
78	7	8	15392	N18 E10	242	700	2.0									
78	7	9	15392	N18 W04	243	700	2.0									
78	7	10	15392	N19 W19	244	1000	2.0									
78	7	11	15392	N19 W32	245	800	1.5									
78	7	12	15392	N19 W44	243	800	1.5									
78	7	13	15392	N19 W59	244	700	1.5									
78	7	14	15392	N19 W72	245	700	1.0									

MCMATH REGION 15400 CMP DATE 9.3

CALCIUM PLAGE DATA — SUNSPOT DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	6	15400	S20 E36	243	300	2.5		S18 E35				B	10	3	BXX
78	7	7	15400	S20 E24	241	800	2.5	20122	S19 E23	240	(BF)	4	B	20	6	BXO
78	7	8	15400	S19 E11	241	900	3.0	20122	S19 E10	240	(B)	4	B	140	15	DKI
78	7	9	15400	S19 W02	241	1000	3.0	20122	S20 W04	240	(B)	4	H	120	26	DAI
78	7	10	15400	S20 W15	241	1300	2.5	20122	S20 W16	240	(B)	4	B	120	21	DSO
78	7	11	15400	S21 W27	240	1600	2.5	20122	S20 W30	240	(B)	4	B	260	22	DSI
78	7	12	15400	S21 W40	239	1700	3.0	20122	S20 W43	240	(B)	4	B	160	11	DSO
78	7	13	15400	S21 W54	239	1700	3.0		S20 W54				B	170	4	DSO
78	7	14	15400	S21 W66	239	2000	2.5	20122	S20 W68	239	(B)	3	B	50	6	DSO
78	7	15	15400	S21 W78	238	800	2.5	20122	S21 W78	236	AF	2	B	30	1	HXX

MCMATH REGION 15393 CMP DATE 10.9 RETURN OF PART OF REGION 15354 ROTATION 4

CALCIUM PLAGE DATA — SUNSPOT DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	5	15393	N20 E73	219	800	1.0									
78	7	6	15393	N19 E63	216	1500	1.5									
78	7	7	15393	N20 E47	218	1200	1.0									
78	7	8	15393	N21 E33	219	1000	1.5									
78	7	9	15393	N21 E19	220	1100	1.5									
78	7	10	15393	N21 E05	221	1100	1.5									
78	7	11	15393	N21 W07	220	1100	1.5									
78	7	12	15393	N21 W19	218	1100	1.0									
78	7	13	15393	N22 W33	218	1000	1.0									
78	7	14	15393	N23 W46	219	900	1.0									
78	7	15	15393	N23 W57	217	700	1.0									
78	7	16	15393	N23 W70	217	400	1.0									

MCMATH REGION 15398 CMP DATE 11.7 RETURN OF PART OF REGION 15354 ROTATION 4

CALCIUM PLAGE DATA — SUNSPOT DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	5	15398	N17 E85	207	500	1.0									
78	7	6	15398	N18 E70	209	600	1.5									
78	7	7	15398	N15 E58	207	700	1.5									
78	7	8	15398	N16 E47	205	1300	2.0									
78	7	9	15398	N17 E31	208	1000	2.0									
78	7	10	15398	N17 E16	210	900	2.0									
78	7	11	15398	N17 E03	210	700	1.5									
78	7	12	15398	N17 W10	209	700	1.5									
78	7	13	15398	N17 W23	208	600	1.5									
78	7	14	15398	N17 W35	208	600	1.5									
78	7	15	15398	N17 W46	206	500	1.0									

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MCMATH REGION 15398 (CONT) CMP DATE 11.7 RETURN OF REGION 15354 ROTATION 4

CALCIUM PLAGE DATA								SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	16	15398	N17 W59	206	400	1.0									

MCMATH REGION 15397 CMP DATE 12.6

CALCIUM PLAGE DATA								SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	6	15397	S20 E82	197	700	3.0	20118	S18 E75	202	(AP)	3				
78	7	7	15397	S20 E68	197	1200	3.5	20118	S18 E62	201	(B)	4	B	70	8	CRO
78	7	8	15397	S20 E55	197	1500	3.5	20118	S18 E50	200	(BP)	3	B	60	11	DAO
78	7	9	15397	S20 E41	198	1600	3.0	20118	S19 E36	200	(AP)	3	H	70	15	DSO
78	7	10	15397	S20 E28	198	1500	3.5	20118	S19 E23	201	(AP)	3	B	40	14	DRO
78	7	11	15397	S20 E14	199	1200	3.0	20118	S19 E10	200	(AP)	3	B	20	19	CRI
78	7	12	15397	S20 E01	198	1200	3.0	20118	S18 W04	201	(AP)	2	B	20	6	BXO
78	7	13	15397	S19 W15	200	1200	2.5		S17 W13				B	10	3	BXO
78	7	14	15397	S20 W26	199	1000	2.5	20118	S19 W29	200	(B)	3	B	10	2	AXX
78	7	15	15397	S20 W38	198	1200	3.0		S18 W40				B	10	6	BXO
78	7	16	15397	S20 W50	197	1000	2.5									
78	7	17	15397	S20 W64	197	1100	2.5									
78	7	18	15397	S21 W77	196	1200	1.0									

MCMATH REGION 15394 CMP DATE 12.9 RETURN OF REGION 15363 ROTATION 2

CALCIUM PLAGE DATA								SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	6	15394	N25 E84	195	600	3.0	20119	N26 E79	198	(AP)	2	B	10	1	AXX
78	7	7	15394	N26 E70	195	1000	3.0	20119	N26 E64	199	(AP)	3	B	20	2	AXX
78	7	8	15394	N27 E57	195	1100	3.0	20119	N26 E50	200	(AP)	3	B	20	3	CRO
78	7	9	15394	N27 E44	195	1100	2.0	20119	N26 E36	200	(AP)	3	H	20	3	DSO
78	7	10	15394	N27 E31	195	1100	2.5	20119	N26 E24	200	(AP)	2				
78	7	11	15394	N27 E18	195	1000	2.0									
78	7	12	15394	N27 E05	194	800	2.0									
78	7	13	15394	N27 W08	193	700	2.0									
78	7	14	15394	N27 W21	194	500	2.0									
78	7	15	15394	N27 W32	192	500	1.5									
78	7	16	15394	N27 W46	193	500	1.5									
78	7	17	15394	N27 W58	191	400	2.0									
78	7	18	15394	N27 W72	191	300	1.5									

MCMATH REGION 15401 CMP DATE 14.2 RETURN OF REGION 15356 ROTATION 5

CALCIUM PLAGE DATA								SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	8	15401	S30 E75	177	1500	2.5		S27 E75				B	10	4	BXO
78	7	9	15401	S30 E60	179	1400	3.0	20126	S32 E55	181	(B)	2				
78	7		15401					20127	S26 E56	180	(AP)	3	H	10	1	AXX
78	7	10	15401	S30 E47	179	1500	2.5	20127	S26 E42	182	(AP)	2	B	10	1	AXX
78	7	11	15401	S30 E35	178	1300	2.0									
78	7	12	15401	S27 E22	177	1300	2.0									
78	7	13	15401	S28 E08	177	1300	2.0									
78	7	14	15401	S28 W03	176	1200	2.0		S28 E00				B	0	1	AXX
78	7	15	15401	S28 W15	175	1200	2.0		S28 W20				B	10	2	BXO
78	7	16	15401	S28 W28	175	1100	2.0									
78	7	17	15401	S28 W42	175	800	2.0									
78	7	18	15401	S28 W55	174	900	2.0									
78	7	19	15401	S28 W70	174	800	1.5									
78	7	20	15401	S28 W81	174	500	1.5									

MCMATH REGION 15406 CMP DATE 14.4

CALCIUM PLAGE DATA								SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	9	15406	S12 E65	174	100	1.5									

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MCMATH REGION 15403 CMP DATE 14.9 RETURN OF PART OF REGION 15360 ROTATION 2

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	7	8	15403	N18 E80	172	4500	3.0
78	7	9	15403	N17 E70	169	4800	4.0
78	7	10	15403	N17 E57	169	5000	4.0
78	7		15403				
78	7	11	15403	N17 E44	169	5000	4.0
78	7		15403				
78	7	12	15403	N18 E31	168	5500	4.0
78	7		15403				
78	7	13	15403	N18 E17	168	5500	3.5
78	7	14	15403	N18 E05	168	5700	3.5
78	7	15	15403	N18 W07	167	5500	3.0
78	7	16	15403	N18 W20	167	5500	3.0
78	7	17	15403	N18 W34	167	5300	3.5
78	7	18	15403	N18 W48	167	6000	3.5
78	7	19	15403	N18 W63	167	5800	3.5
78	7	20	15403	N19 W75	168	5500	3.5
78	7	21	15403	N19 W87	167	3500	2.5

SUNSPOT DATA

MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
20123	N17 E82	168	(D)	3	B	450	5	DKI
20123	N18 E68	165	(D)	5	H	760	7	DKO
20123	N18 E55	169	(D)	5	B	1080	16	EKC
20129	N25 E54	170	(AP)	3	B	10	1	AXX
20123	N18 E41	169	(D)	5	B	1330	51	EKC
20129	N24 E40	170	(AP)	3	B	10	2	AXX
20123	N18 E29	168	(D)	5	B	950	38	DKC
20129	N24 E28	169	(AP)	3	B	10	1	AXX
	N18 E16				B	1040	40	EKC
20123	N18 E02	169	(D)	5	B	900	75	EKC
20123	N17 W11	169	(D)	6	B	860	50	EKC
20123	N18 W25	169	(D)	5	B	780	36	EKC
20123	N18 W38	169	(D)	5	B	580	33	FKC
20123	N18 W50	168	(D)	5	B	630	19	EKC
20123	N18 W63	168	(D)	5	B	520	8	EKC
20123	N18 W74	167	(D)	5				
	N17 W82				H	1400	1	EKI

MCMATH REGION 15411 CMP DATE 16.0

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	7	10	15411	S13 E80	146	300	2.5
78	7	11	15411	S13 E63	150	300	2.0
78	7	12	15411	S13 E50	149	300	1.5
78	7	13	15411	S13 E34	151	200	1.0
78	7	14	15411	S13 E21	152	200	1.5
78	7	15	15411	S13 E07	153	300	1.0
78	7	16	15411	S13 W03	150	300	1.0
78	7	17	15411	S13 W15	148	100	1.0

SUNSPOT DATA

MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
20130	S12 E73	151	(AP)	1				
20130	S12 E58	152	(AP)	2	B	10	1	AXX

MCMATH REGION 15410 CMP DATE 17.0 RETURN OF REGION 15370 ROTATION 2

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	7	10	15410	N13 E87	139	1200	2.0
78	7	11	15410	N14 E74	139	1500	3.5
78	7	12	15410	N15 E60	139	3000	3.5
78	7	14	15410	N15 E33	140	2800	3.5
78	7	15	15410	N15 E20	140	2600	3.0
78	7	16	15410	N15 E07	140	2400	3.0
78	7		15410				
78	7	17	15410	N15 W06	139	2500	3.0
78	7		15410				
78	7	18	15410	N15 W20	139	2600	3.0
78	7		15410				
78	7	19	15410	N15 W36	140	2600	3.0
78	7		15410				
78	7	20	15410	N15 W47	140	2500	3.0
78	7	21	15410	N15 W60	140	2500	3.0
78	7	22	15410	N15 W73	139	2700	2.0
78	7	23	15410	N15 W85	137	1500	1.0

SUNSPOT DATA

MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
20131	N15 E85	139	AP	1	B	40	1	HSX
20131	N15 E69	141	(B)	2	B	30	8	DRO
20131	N15 E56	141	(AP)	3	B	100	8	DRO
20131	N15 E30	141	(AP)	4	B	80	11	CAI
20131	N15 E16	142	(AP)	4	B	50	3	DRO
20131	N16 E02	142	(AP)	4	B	40	11	DRO
20138	N11 E08	136	(BY)	3				
20131	N16 W11	142	(AP)	4	B	40	9	CSO
20138	N12 W07	138	(AP)	3	B	10	5	BXO
20131	N16 W25	143	(BY)	4	B	30	7	BXO
20138	N12 W19	137	(AF)	3	B	10	3	BXO
20131	N17 W35	140	(B)	3	B	10	4	BXO
20138	N11 W31	136	(BF)	4	B	10	2	AXX
20138	N11 W44	137	(AF)	2	B	10	3	BXO
20138	N12 W57	137	(B)	3	H	0	1	AXX

MCMATH REGION 15417 CMP DATE 17.0

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	7	15	15417	N31 E18	142	100	2.0
78	7	16	15417	N31 E06	141	200	1.0

SUNSPOT DATA

MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
20136	N31 E15	143	(B)	1				

MCMATH REGION 15419 CMP DATE 18.2

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	7	15	15419	N12 E36	124	200	2.5
78	7	16	15419	N12 E24	123	400	2.0
78	7	17	15419	N13 E10	123	500	2.0
78	7	18	15419	N13 W03	122	500	2.5
78	7	19	15419	N13 W18	122	500	2.5

SUNSPOT DATA

MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
20137	N12 E35	123	(B)	2	B	0	1	AXX
20137	N13 E19	125	(BP)	4	B	20	5	CRO
20137	N13 E06	125	(BP)	4	B	50	6	CRO
20137	N13 W07	125	(B)	4	B	40	6	CAO
20137	N12 W26	131	(AP)	3	B	10	3	BXO

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MCMATH REGION 15419 (CONT) CMP DATE 18.2

				CALCIUM	PLAGE	DATA		SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	20	15419	N13 W29	122	400	2.5	20137	N12 W38	131	(AP)	2				
78	7	21	15419	N13 W43	123	400	2.0	20137	N12 W52	132	(AP)	2				
78	7	22	15419	N13 W56	122	300	1.0									
78	7	23	15419	N13 W70	122	200	1.0									

MCMATH REGION 15430 CMP DATE 18.3

				CALCIUM	PLAGE	DATA		SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	19	15430	S39 W19	123	100	2.5	20143	S38 W17	122	(B)	2	B	0	2	BXO
78	7	20	15430	S39 W28	121	500	2.5	20143	S38 W28	121	(B)	2	B	10	6	BXO
78	7	21	15430	S39 W41	121	500	2.5	20143	S38 W43	123	(B)	2	H	30	7	BXO
78	7	22	15430	S39 W54	120	500	2.0									
78	7	23	15430	S38 W66	118	500	2.0									
78	7	24	15430	S38 W79	119	500	1.5									

MCMATH REGION 15413 CMP DATE 18.4

				CALCIUM	PLAGE	DATA		SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	12	15413	S25 E80	119	600	1.0									
78	7	13	15413	S24 E65	120	500	1.5									
78	7	14	15413	S23 E52	121	500	2.5	20133	S24 E50	121	(AP)	3	B	0	1	AXX
78	7	15	15413	S23 E38	122	600	2.5	20133	S24 E37	121	(B)	4	B	70	8	DRO
78	7	16	15413	S23 E24	123	600	2.0	20133	S23 E21	123	(BP)	4	B	40	6	DSO
78	7	17	15413	S23 E12	121	700	2.0	20133	S23 E07	124	(AP)	4	B	20	2	CSO
78	7	18	15413	S23 W03	122	600	2.5	20133	S23 W06	124	(AP)	4	B	50	3	CAO
78	7	19	15413	S23 W17	121	600	2.0	20133	S24 W19	124	(AP)	4	B	40	1	HSX
78	7	20	15413	S24 W30	123	500	2.5	20133	S24 W31	124	(AP)	3	B	30	1	HSX
78	7	21	15413	S24 W43	123	500	2.0	20133	S24 W44	124	(AP)	3	H	20	1	HSX
78	7	22	15413	S24 W57	123	700	2.0	20133	S24 W57	123	(AP)	3	B	20	2	CRO
78	7	23	15413	S24 W72	124	700	1.5	20133	S23 W70	122	(AP)	2	B	10	1	HRX

MCMATH REGION 15427 CMP DATE 18.5

				CALCIUM	PLAGE	DATA		SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	18	15427	N29 W01	120	100	1.5									

MCMATH REGION 15415 CMP DATE 19.7

				CALCIUM	PLAGE	DATA		SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	13	15415	N15 E83	102	1800	2.5		N20 E79				B	60	2	CSO
78	7	14	15415	N15 E71	102	3000	2.5	20134	N22 E61	110	(AP)	3				
78	7		15415					20135	N19 E62	109	(AF)	3	B	30	2	CSO
78	7	15	15415	N16 E56	104	3500	3.0	20134	N21 E48	110	(AP)	2				
78	4		15415					20135	N18 E48	110	(AF)	3				
78	7	16	15415	N16 E44	103	3500	3.0	20139	N14 E38	106	(AP)	1				
78	7		15415					20135	N19 E34	110	(BF)	2	B	10	5	CRO
78	7	17	15415	N16 E31	102	3000	3.0	20139	N13 E27	104	(B)	2				
78	7		15415					20135	N19 E20	111	(B)	1	B	10	5	BXO
78	7	18	15415	N15 E16	103	2800	3.0	20135	N19 E07	111	(B)	3	B	10	6	BXO
78	7	19	15415	N15 E00	104	2800	3.0	20135	N19 W09	114	(B)	3	B	10	5	BXO
78	7	20	15415	N15 W11	104	2800	3.0	20135	N18 W20	113	(B)	3	B	660	4	DKC
78	7	21	15415	N15 W25	105	2800	3.0	20135	N18 W35	115	(B)	4	H	60	9	CRO
78	7	22	15415	N15 W39	105	3000	3.0	20145	N13 W43	109	(AP)	3	B	20	6	CRO
78	7		15415					20135	N18 W48	114	(B)	4	B	50	3	DSO
78	7	23	15415	N15 W54	106	3000	4.0	20145	N14 W56	108	(B)	2	B	50	1	DSO
78	7		15415					20135	N18 W66	118	(AP)	3				
78	7	24	15415	N16 W67	107	2700	3.0	20145	N13 W70	110	(AP)	2	B	10	3	BXO
78	7		15415					20135	N17 W77	117	(AP)	2	B	30	1	HSX
78	7	25	15415	N16 W80	107	1800	2.0									
78	7	26	15415	N15 W90	104	500	1.0									

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MCMATH REGION 15416 CMP DATE 20.2 RETURN OF PART OF REGION 15366 ROTATION 3

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	13	15416	S25 E85	100	1000	1.5									
78	7	14	15416	S24 E75	98	2000	1.5									
78	7	15	15416	S24 E62	98	1800	2.5									
78	7	16	15416	S24 E48	99	2000	2.5									
78	7	17	15416	S24 E36	97	2000	2.0									
78	7	18	15416	S24 E21	98	1800	2.5									
78	7	19	15416	S24 E06	98	1800	2.0									
78	7	20	15416	S24 W05	98	1500	2.0									
78	7	21	15416	S24 W19	99	1500	2.0									
78	7	22	15416	S25 W31	97	1800	2.0									
78	7	23	15416	S25 W48	100	1800	2.0									
78	7	24	15416	S25 W61	101	1800	2.5									
78	7	25	15416	S25 W73	100	1800	3.0	20148	S24 W75	101	X	1	B	10	1	AXX

MCMATH REGION 15421 CMP DATE 21.0 RETURN OF PART OF REGION 15366

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	15	15421	S19 E75	85	500	1.5									
78	7	16	15421	S18 E60	87	600	2.0									
78	7	17	15421	S18 E47	86	700	2.0									
78	7	18	15421	S18 E34	85	800	2.0									
78	7	19	15421	S18 E18	86	700	2.0									
78	7	20	15421	S18 E06	87	900	2.0									
78	7	21	15421	S18 W07	87	900	1.5									
78	7	22	15421	S18 W20	86	1000	2.0									
78	7	23	15421	S18 W36	88	1200	2.0									
78	7	24	15421	S18 W49	89	800	2.0									
78	7	25	15421	S18 W61	88	1000	1.5									
78	7	26	15421	S18 W75	89	600	1.0									

MCMATH REGION 15422 CMP DATE 22.2

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	17	15422	S27 E61	72	400	2.5									
78	7	18	15422	S28 E48	71	400	2.0	20141	S27 E46	72	(B)	2	B	10	2	BXO
78	7	19	15422	S28 E33	71	400	2.0									
78	7	20	15422	S28 E23	70	400	2.0									
78	7	21	15422	S26 E08	72	400	2.0									
78	7	22	15422	S26 W06	72	300	1.5									
78	7	23	15422	S26 W20	72	300	2.0									

MCMATH REGION 15424 CMP DATE 22.3

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	17	15424	N34 E62	71	100	2.0	20140	N33 E56	75	(AP)	2				
78	7	18	15424	N34 E49	70	200	1.0									
78	7	19	15424	N34 E34	70	200	1.0									
78	7	20	15424	N34 E23	70	100	1.0									
78	7	21	15424	N34 E10	70	100	1.0									
78	7	22	15424	N34 W02	68	100	1.5									
78	7	23	15424	N35 W16	68	300	1.0									

MCMATH REGION 15442 CMP DATE 22.3

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	27	15442	N36 W69	69	200	2.0									
78	7	28	15442	N36 W80	69	100	1.5									

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MCMATH REGION 15420 — CMP DATE 22.6 — RETURN OF PART OF REGION 15368 — ROTATION 4

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	16	15420	N19 E78	69	1500	2.0									
78	7	17	15420	N19 E65	68	2200	2.5									
78	7	18	15420	N19 E53	66	2000	2.5	20142	N20 E57	61	(AF)	1				
78	7	19	15420	N19 E38	66	2000	2.5									
78	7	20	15420	N19 E27	66	1600	2.0									
78	7	21	15420	N19 E14	66	1500	2.5									
78	7	22	15420	N19 E00	66	1400	2.5									
78	7	23	15420	N19 W12	64	1500	2.5		N14 W17				B	0	1	AXX
78	7	24	15420	N19 W25	65	1300	2.0									
78	7	25	15420	N19 W39	66	1500	2.0									
78	7	26	15420	N19 W54	68	1200	2.0	20150	N14 W59	72	(B)	3	R	20	2	BXO
78	7	27	15420	N19 W67	67	1200	2.0									
78	7	28	15420	N19 W78	67	1200	1.5									
78	7	29	15420	N22 W90	65	600	1.0									

MCMATH REGION 15423 — CMP DATE 22.6 — RETURN OF REGION 15374 — ROTATION 3

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	17	15423	S16 E72	61	600	1.0									
78	7	18	15423	S17 E57	62	700	2.0									
78	7	19	15423	S16 E40	64	600	1.5		S16 E34				B	0	1	AXX
78	7	20	15423	S16 E28	65	800	1.5									
78	7	21	15423	S16 E14	66	900	2.0	20144	S15 E05	75	(AP)	2				
78	7	22	15423	S16 E00	66	800	2.0									
78	7	23	15423	S16 W13	65	900	2.0									
78	7	24	15423	S16 W26	66	800	2.0									
78	7	25	15423	S17 W39	66	700	2.0									
78	7	26	15423	S17 W53	67	800	1.5									
78	7	27	15423	S17 W65	65	800	1.5									
78	7	28	15423	S17 W77	66	800	1.5									

MCMATH REGION 15429 — CMP DATE 24.8 — RETURN OF REGION 15375 — ROTATION 2

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	18	15429	S24 E84	35	1500	2.0									
78	7	19	15429	S23 E68	36	1900	2.5									
78	7	20	15429	S23 E58	35	1800	2.5									
78	7	21	15429	S23 E45	35	2000	2.5									
78	7	22	15429	S23 E31	35	2600	2.5									
78	7	23	15429	S23 E16	36	2400	2.5									
78	7	24	15429	S23 E03	37	1900	2.5									
78	7	25	15429	S23 W09	36	2000	2.5									
78	7	26	15429	S23 W22	36	2400	2.0									
78	7	27	15429	S23 W35	35	2200	2.0									
78	7	28	15429	S23 W47	36	2200	2.0									
78	7	29	15429	S24 W60	35	2000	2.0									
78	7	30	15429	S23 W73	35	1300	1.0									
78	7	31	15429	S24 W85	35	600	1.0									

MCMATH REGION 15428 — CMP DATE 25.1 — RETURN OF REGION 15373 AND 15376 — ROTATION 2 AND 3

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	7	18	15428	N20 E80	39	2000	1.5									
78	7	19	15428	N23 E68	36	3700	2.5									
78	7	20	15428	N23 E58	35	3700	2.5									
78	7	21	15428	N23 E46	34	4000	2.5									
78	7	22	15428	N23 E34	32	4000	2.5	20146	N18 E40	26	(AF)	3	B	10	2	HRX
78	7		15428					20147	N27 E51	15	(AP)	2	B	0	1	AXX
78	7	23	15428	N23 E21	31	4000	3.0	20146	N18 E23	29	(AP)	3	B	20	6	BXO
78	7		15428						N27 E31				B	0	1	AXX
78	7	24	15428	N23 E08	32	4000	3.0	20147	N27 E27	13	(B)	3	B	20	7	BXI
78	7	25	15428	N23 W05	32	4000	3.0	20146	N18 W03	29	(B)	2	B	0	2	AXX
78	7		15428					20147	N27 E13	13	(B)	3	B	10	6	BXO
78	7	26	15428	N23 W17	31	3800	3.0									
78	7	27	15428	N23 W29	29	3800	3.0	20147	N26 W13	12	(B)	3	B	10	6	BXO
78	7	28	15428	N24 W40	29	4000	3.0	20147	N28 W23	10	(AF)	3	H	20	2	CRO
78	7	29	15428	N25 W52	27	3700	2.5	20147	N28 W35	10	(AF)	2				
78	7	30	15428	N25 W65	27	3700	2.5									
78	7	31	15428	N26 W77	27	2500	2.0									
78	8	1	15428	N30 W90		1000	1.0									

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MCMATH REGION 15432 CMP DATE 27.1 RETURN OF PART OF REGION 15377 ROTATION 3

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	HW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT CLASS
78	7	21	15432	S27 E75	5	200	1.0								
78	7	22	15432	S26 E62	4	200	1.0								
78	7	23	15432	S26 E46	6	200	1.5								

MCMATH REGION 15433 CMP DATE 27.9

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	HW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT CLASS
78	7	22	15433	S24 E75	352	300	1.5								
78	7	23	15433	S24 E60	353	200	1.5								
78	7	24	15433	S24 E45	356	200	2.0								
78	7	25	15433	S24 E31	357	300	2.0								
78	7	26	15433	S23 E17	358	200	1.0								

MCMATH REGION 15434 CMP DATE 29.2 RETURN OF REGION 15381 AND 15387 ROTATION 2 AND 3

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	HW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT CLASS
78	7	22	15434	N14 E85	342	400	1.0								
78	7	23	15434	N16 E69	344	600	1.5								
78	7	24	15434	N16 E59	342	600	1.5								
78	7	25	15434	N15 E48	340	700	2.0								
78	7	26	15434	N15 E34	341	700	1.5								
78	7	27	15434	N15 E21	340	700	1.5								
78	7	28	15434	N15 E09	340	700	1.5								
78	7	29	15434	N15 W05	340	700	1.5								
78	7	30	15434	N15 W18	340	700	1.5								
78	7	31	15434	N15 W30	340	800	1.5								
78	8	1	15434	N15 W43		800	1.5								
78	8	2	15434	N15 W56		800	1.5								
78	8	3	15434	N15 W70		800	1.0								

MCMATH REGION 15435 CMP DATE 29.3

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	HW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT CLASS
78	7	23	15435	S16 E78	335	300	1.5								
78	7	24	15435	S16 E64	337	200	2.0								
78	7	25	15435	S16 E50	338	500	2.0	20149	S14 E56	331	(AF)	3	B	0	1 AXX
78	7	26	15435	S16 E36	339	500	1.5								
78	7	27	15435	S16 E23	338	500	2.0								
78	7	28	15435	S16 E10	339	500	2.0								
78	7	29	15435	S16 W04	339	300	1.0								
78	7	30	15435	S16 W17	339	300	1.5								
78	7	31	15435	S16 W30	340	200	1.5								
78	8	1	15435	S16 W43		200	1.5								
78	8	2	15435	S16 W56		100	1.0								
78	8	3	15435	S16 W70		200	1.5								

MCMATH REGION 15436 CMP DATE 30.7 RETURN OF REGION 15389 ROTATION 2

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	HW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT CLASS
78	7	23	15436	S27 E85	328	300	1.0								
78	7	24	15436	S27 E80	321	700	2.5								
78	7	25	15436	S27 E66	322	1000	2.5								
78	7	26	15436	S27 E53	322	1000	2.0								
78	7	27	15436	S27 E40	321	1200	2.0								
78	7	28	15436	S26 E27	322	1200	2.0								
78	7	29	15436	S26 E15	320	900	1.5								
78	7	30	15436	S27 E02	320	900	1.5								
78	7	31	15436	S27 W10	320	900	1.5								
78	8	1	15436	S27 W24		900	1.5								
78	8	2	15436	S27 W38		900	1.5								
78	8	3	15436	S27 W53		1000	1.5								
78	8	4	15436	S27 W65		1000	1.5								
78	8	5	15436	S27 W77		300	1.0								
78	8	6	15436	S27 W82		300	1.0								

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MCMATH REGION 15439 CMP DATE 30.9 RETURN OF REGION 15384 ROTATION 3

			CALCIUM PLAGE DATA					SUNSPOT DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA CNT CLASS
78	7	24	15439	S18 E85	316	600	1.5							
78	7	25	15439	S18 E70	318	400	1.5							
78	7	26	15439	S18 E56	319	600	2.0							
78	7	27	15439	S17 E43	318	900	2.0							
78	7	28	15439	S17 E31	318	1000	2.0							
78	7	29	15439	S17 E17	318	900	2.0							
78	7	30	15439	S17 E05	317	800	1.5							
78	7	31	15439	S17 W09	319	700	1.5							
78	8	1	15439	S17 W22		600	1.5							
78	8	2	15439	S17 W35		600	1.5							
78	8	3	15439	S17 W49		600	1.5							
78	8	4	15439	S17 W62		600	1.5							
78	8	5	15439	S17 W73		400	1.0							

MCMATH REGION 15448 CMP DATE 31.3

			CALCIUM PLAGE DATA					SUNSPOT DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA CNT CLASS
78	8	2	15448	N27 W28		300	2.0							
78	8	3	15448	N27 W43		700	2.0	20155	N24 W44		(AP)	7		
78	8	4	15448	N27 W54		700	2.0	20155	N25 W55		(B)	2		
78	8	5	15448	N27 W66		500	2.0	20155	N25 W70					
78	8	6	15448	N27 W80		400	1.5							

MCMATH REGION 15440 CMP DATE 31.4 RETURN OF REGION 15390 ROTATION 2

			CALCIUM PLAGE DATA					SUNSPOT DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA CNT CLASS
78	7	24	15440	N21 E88	313	200	1.0							
78	7	25	15440	N22 E77	311	600	1.5							
78	7	26	15440	N23 E62	313	500	1.5							
78	7	27	15440	N24 E51	310	300	1.0							

Note: No calcium spectroheliograms were secured at the McMath-Hulbert Observatory on July 1, 2, 3, and 4, 1978.
No sunspot observations were made at Mt. Wilson on July 13, 1978.

DAILY CALCIUM PLAGE INDEX

JULY 1978

YR	MO	DAY	INDEX	YR	MO	DAY	INDEX	YR	MO	DAY	INDEX
78	7	1	*	78	7	11	32.6	78	7	21	32.1
78	7	2	*	78	7	12	39.3	78	7	22	32.1
78	7	3	*	78	7	13	37.0	78	7	23	33.4
78	7	4	*	78	7	14	38.8	78	7	24	25.8
78	7	5	26.7	78	7	15	38.2	78	7	25	24.3
78	7	6	23.4	78	7	16	38.9	78	7	26	19.8
78	7	7	20.8	78	7	17	40.3	78	7	27	18.8
78	7	8	25.3	78	7	18	41.5	78	7	28	18.6
78	7	9	25.6	78	7	19	39.2	78	7	29	15.6
78	7	10	32.2	78	7	20	35.0	78	7	30	14.0
								78	7	31	14.3

* NO OBSERVATIONS

SUDDEN IONOSPHERIC DISTURBANCES

JULY 1978

DAY	UNIVERSAL TIME START	END	MAX	IMP	WIDE SPREAD INDEX	NUMBER OF STATION REPORTS BY TYPE SWF	SCNA	SEA	SPA	LF-SPA	SES	SFD	KNOWN FLARE	McMATH REGION
01	0304	0401	0307	1-	1				1				0304	15376
01	0525	0705	0542	1-	1				1				0532	X-RAY
01	1036	1055	1045	1-	1			1	1				1033	X-RAY
01	1341	1450	1353	2-	5	3	1	6	3		14		1330	X-RAY
01	1450	1703	1506	1	5	1		1	1		10		NF	
02	0130	0222	0150	1-	1				1				0219	X-RAY
02	0843U	0905	0849	1-	1			1					*	
02	1404	1552	1417	2	5	5	2	4	2		16		1400	X-RAY
02	2028	2148D	2046	1-	3				1		3		2024	X-RAY
02	2148	2230	2154	1-	3				1		1		2146E	X-RAY
02	2250	2330	2255	1-	1			1					2251	X-RAY
03	0037	0114	0043	1-	1				1				0034	X-RAY
03	0616	0732	0642	1-	1				1				0612	X-RAY
04	0005	0110	0008	1-	1				1				0005	X-RAY
04	0912	1042	0949	1-	1				1				*	
04	0942	1030	0951	1+	3	2		3	1		1		*	
04	2045	2123	2048	1-	1				1				*	
05	1139	1410	1216	2	5	3	1	1	2		2		1139	15389
05	1749	2035	1805	1-	3						4		1748	15389
06	1207	1321	1216	1	5	2		3	3		2		1206	15389
06	1441	1500	1450	1-	1			1					1439	15391
06	1511	1612	1517	2	3	5	2	6	3	1	12		1510	15389
06	2027	2115	2035	1-	3						2		2028	15389
07	0152	0258	0159	1-	1				1				0151	15389
07	0401	0530D	0415	1-	1				1				0400	15389
07	0533	0640	0547	2	5	4		5	3		3		0528	X-RAY
07	0757E	0929D	0810	1-	1				1				0756	X-RAY
07	0933	1149	0949	3-	5	4		4	4		2		0928	X-RAY
07	1211	1348	1219	2-	5	3	1	4	4		10		1211	15397
07	1442	1556	1450	1	5	5		2	3		15		1437	15389
07	1641	1715	1644	1-	5			1			11		1656	15397
07	1758	2000	1812	1+	5	2	1	1	2	1	13		1802	15389
08	1946	2052	1958	2+	5	3			2	1	11		1947E	15403
09	0059	0130	0105	1-	1				1				0059	X-RAY
09	0506E	0543D	0510	1-	1				1				0506	X-RAY
09	0712	0732	0717	1	5	3		5	4		3		0707	X-RAY
09	0850	0935	0857	1	5			4	3		2		0848	X-RAY
09	1010	1125	1016	1	5	3		5	4		4		1007	X-RAY
09	1136	1157D	1157	1	5	2		2	2		1		1133E	15403
09	1209	1400	1240	2	5	2	1	3	4		9		1211	X-RAY
09	1239	1250D	1250	2	5	1			1		8		NF	
09	1424	1543	1436	1+	5	1		2	2		9		NF	
09	1649	1739	1654	1	5	4	1	2	3		11		1640E	15403
09	1736	1803	1742	1-	5	1			1		8		1737	15397
09	1818	2118D	1832	2+	5	6	1	5	4		15		1811E	15403
09	2223E	2307D	2233	1-	5				1		5		2223	X-RAY
09	2308	0012D	2313	1-	5	1			1		6		2301	15403
10	0011	0056	0019	1-	1				1				0012	X-RAY
10	0135	0446D	0147	3-	5	1		1	1		3		0137	15403
10	0232	0308D	0242	1-	3	1		1			1		0225	15409
10	0308	0344	0319	1	3	1		1			1		0307	X-RAY
10	0350	0418	0400	1-	1	1							*	
10	0520	0606D	0530	1-	3			1	1				0520	X-RAY
10	0605	0805	0625	3	5	4	1	6	2		3		0606	15390
10	0924	0945	0928	1+	3	2		1	1		2		0922	X-RAY
10	1315	1446	1332	2-	5	6	1	5	3		12		1312	15403
10	1550	1610	1554	1-	3			1	2		1		1550	15403
10	1705	1715D	1715	1+	5	6	2	5	4		12		1700	15403
10	1728	1915	1735	2-	5	4		1	4	1	8		1729E	15403
10	1830U	2028D	1920	1	1						1		1826	15403
10	1914	2006	1924	1+	5	2	1		3	1	10		1913E	15403
10	2029E	2133D	2051	1	5	3	1		2	1	7		2028	15403
10	2133E	2247D	2143	1-	5				1		6		2136	15403
10	2246	2350	2251	1-	5	1			1		3		2246	15403
10	2353E	0034	0008	1-	1				1				2358	15397

SUDDEN IONOSPHERIC DISTURBANCES

JULY 1978

DAY	UNIVERSAL TIME START	END	MAX	IMP	WIDE SPREAD INDEX	NUMBER OF STATION REPORTS BY TYPE SWF	SCNA	SEA	SPA	LF-SPA	SES	SFD	KNOWN FLARE	McMATH REGION
11	0053	0246	0106	2	5	2		1	1		3		0054	15403
11	0338	0825	0546	2	1				1				0335	X-RAY
11	0400	0425	0403	1	5	1		1			2		0359E	15403
11	0428	0530	0442	2	5	4		4	1		2		0421	X-RAY
11	0540	0630	0549	2	5	4		6	3		3		0539	X-RAY
11	0705	0730	0712	1-	5	1		2	2				0705E	15403
11	0931	1117	0942	2-	5	3		4	3		1		0935	15403
11	1049	1320	1056	3	5	3	2	5	2		10		1049	15403
11	1455	1523	1510	1-	1			1	1				1455E	15403
11	1539	1610	1553	1-	5	1			2		7		1529	15403
11	1615	1630	1619	1-	5			1	2		5		1613	15403
11	1649	1805	1655	1-	5	3		3	4	1	15		1645	15403
11	2022	2156	2039	1	5	1	1	1	2	1	15		2017	15403
11	2227	2400	2232	2+	5	3		1	1		13		2228	15392
12	0012E	0110D	0022	1-	5	1		1	1		2		0012	15403
12	0110	0154	0117	1-	5			1	1		2		0110	15403
12	0240	0424	0301	2+	5	1		1	1		2		0249E	15403
12	0520	0624	0528	1-	1				1				0521	15403
12	0555E	0646	0600	1-	1				1				0556E	15410
12	0810	0835	0817	1-	5			1	2		1		0810	15403
12	0903E	0953	0910	2	5	3	1	4	3		1		0905	15403
12	0921	0935	0925	1-	1			1	1				0922	15403
12	1013	1130	1024	2	5	3		4	4		3		1013	15403
12	1321	1426	1334	1	5	3		2	3		12		1319	15403
12	1354	1450	1400	1	5	2		1	2		12		1354E	15409
12	1535	1540D	1540	1-	1		1						1530	15403
12	1601	1655	1616	1+	5	6	1	3	3	1	16		1555	15403
12	1737	1747D	1747	1-	3						5		1739	15409
12	1800	1830	1805	1-	5	1					9		1759	15403
12	2052	2236	2100	2	5	4	1	1	2	1	11		2049	15403
13	0222	0305	0235	1-	1				1				0225E	15415
13	0320E	0354	0326	1-	1				1				0320	15403
13	0444	0525	0455	1-	1				1				0445	15409
13	0531E	0601	0541	1-	1				1				0540	15403
13	0624E	0643	0627	1-	1				1				0625	15403
13	0736	0814	0749	1-	1				1				0742	15403
13	0833	0845	0837	1-	3	1		1	2		1		0829	15409
13	1016	1025	1020	1-	1			1	1				1018	15403
13	1458	1507	1503	1-	1			1	1				1456	X-RAY
13	1820	1856	1824	1-	1			1					*	
13	2308	2347	2315	1-	1				1				2300	15403
14	0521	0600	0532	1-	1				1				0527	15403
14	1100	1305	1110	1-	5			1	4		2		1100	15403
14	1134	1150	1139	1-	1			1	1				1133	15415
14	1626	1717	1638	1-	5	1	1	1	1		10		1625E	15403
15	0053	0252	0100	2	5	2		1	1		4		0053E	15403
15	0405	0522	0415	1-	1				1				0405E	15403
15	1425	1602	1438	1+	5	6		5	3	1	12		1425	15403
15	1520	1606	1523	1-	3						5		1516	X-RAY
15	1950	2030	1955	1-	5						8		1950	15403
17	0154	0235	0202	1-	1				1				0156	15403
17	0246	0324	0253	1-	1				1				0246E	15403
17	0936	1001	0942	1	1			1					0939	15397
17	1403	1525	1438	1-	5			3	2		8		1350	15403
17	1430	1515	1435	1-	5			1	2		7		1425	15403
17	1843	1902	1847	1	1	1							1839	15410
17	2130	2244	2144	1-	5	1	1	1	2	1	13		2133	15403
18	0019	0114	0026	1	3	1			1		2		0018	15403
18	0855	0955	0906	2	5	3		5	3		2		0845	15403
18	1307	1345	1315	1-	5	1		1	3		8		1306	15403
18	1538	1555	1542	1-	5			1	1		7		1534	15415
18	1722	1915	1732	1	5	3	1	3	4	1	11		1719	15403
18	1947	2247	2024	3	5	3	1	1	1		12		1948E	15403
18	2018	2200	2024	1-	5						5		NF	
19	0511	0627	0520	1-	1				1				0513E	15403
19	0938	1053	1007	1	3			2					0945	15410
19	1321	1430	1341	1	3	1			1		1		1321	15403

SUDDEN IONOSPHERIC DISTURBANCES

JULY 1978

DAY	UNIVERSAL TIME START	END	MAX	IMP	WIDE SPREAD INDEX	NUMBER OF STATION REPORTS BY TYPE SWF	SCNA	SEA	SPA	LF-SPA	SES	SFD	KNOWN FLARE	McMATH REGION
20	0010	0154	0022	2	5	2			1		2		0006E	15403
20	0316	0346	0322	1-	3				1		1		0313	X-RAY
20	0551	0647	0556	1-	3				1		1		0550	X-RAY
20	1515	1605	1524	1-	5	1		1	1		7		1510E	15403
20	1610	1640	1615	1-	5	4		2	3	1	15		1606	15403
20	1702	1723	1709	1-	5						5		1705E	15410
20	1859	1925	1904	1-	3						3		1854	X-RAY
20	2122	2218	2138	1-	1				1				2126	X-RAY
21	0111	0150	0124	1-	3	1			1				0109	X-RAY
21	0431	0607D	0454	1+	1				1				0428	X-RAY
21	0449	0600	0455	1-	3	1			1				0451E	15403
21	0607E	0648	0612	1-	1				1				0604	15403
21	0829	0914	0832	1-	3			1	1				0824	X-RAY
21	1044	1108	1150	1-	5			1	2		2		1041	X-RAY
21	1114	1147	1131	1-	5	1		1	2		1		1117	X-RAY
21	1125	1223	1137	1-	1				1		1		1123	15403
21	1150	1225	1158	1-	5	2		1	2		3		1146	X-RAY
21	1300	1345	1326	1-	1				1		1		1258	X-RAY
21	1519	1537	1526	1-	5	1		2	2		9		1507	15410
21	1541	1635	1556	1	5	6	1	3	3	1	15		1538	X-RAY
21	1826	2130	1909	1	5	1			1		5		1822	X-RAY
21	1853	2100	1908	2	5	3	1	2	3	1	12		1843	15410
22	1259	1450	1338	1	5	2		3	3		11		1250	X-RAY
22	1315	1520	1335	2	5			1	2		5		NF	
23	0502	0545	0520	1-	1				1				0511	X-RAY
23	1635	1930	1708	1+	5	3		1	3		10		1639	X-RAY
23	2008	2050	2011	1-	1	1							*	
29	1040	1140	1110	1-	1				1		1		1045E	15443

PERIODS OF NO OBSERVATIONS:

DATE	TIME (UT) and STATION
01	0000-2400 A3
03-06	0000-2400 A3
03	1658-1810 TM
05	2146-2200 TM
08-09	0000-2400 A1
10	0000-2400 A3
11	0000-2400 TN, 0000-2400 A1, 1011-1332 UM (16 kHz)
12	0000-2400 TN, 0000-2400 A3
13	0000-2400 A3
15-16	0000-2400 A3
18	1010-1340 UM (16 kHz)
20	1047-1412 TM
21	0752-0807 Um (16 kHz)
22-31	0000-2400 A3
25	0000-2400 TN, 1003-1338 UM (16 kHz)

STATIONS REPORTING FOR JULY 1978

AAVSO (A1, A3, A5, A19, A21, A26, A28, A31, A34, A37, A40, A45, A46) (SES) (A1, A31) (SEA (A31) (SWF)
CHILWORTH (CL) (SCNA
DARMSTADT (DA) (SWF)
HIRAISO (HI) (SWF)
HOBART (TA) (SEA, SES)
HUANCAYO (HU) (SWF)
INUBO (IN) (SPA)
JULIUSHUH (JH) (SWF)
KUHLUNGSBORN (KU) (SEA, SPA)
MCMATH (MC) (SWF, SCNA)
NEW JERSEY (NJ) (SES)
PANSKA VES (PU) (SWF, SEA, SES)
PRESTON (LO) (SEA)
SAO PAULO (UM) (SES, SPA)
SOFIA (SF) (SES)
ST CLOUD (SC) (SES)
TABLE MOUNTAIN (TM) (SPA, LF-SPA)
TORINO (TN) (SPA)
UPICE (UI) (SEA)
VSETIN (VS) (SEA)

SIDs BY McMATH REGION

JULY 1978

DAY	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
REGION																															
15376	1																														
15389					2	3	4																								
15390										1																					
15391						1																									
15392											1																				
15397							2		1	1							1														
15403								1	4	10	10	13	6	3	4		5	5	2	3	3										
15409										1		2	2																		
15410												1					1		1	1	2										
15415													1	1				1													
15443																													1		
X-RAY	3	5	2	1			3		7	4	3		1		1					4	9	1	2								
UNKNOWN	1								2	1								1				1									
NO FP		1		3									1										1								

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

JULY 1978

JUL 1978	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
01	0000	0738	MANI										
	0000	0718	CULG				0210.5						IIIB,W
			CULG				0212						IIIB,W
			CULG	0227	0315	1							IS
			CULG	0303	0304.5	1							IIIG
			CULG				0336.5	0344					IIIGG,W
			CULG				0338	0342	1				IIIG,V
			CULG				0357	0358.5					IIIG,W
			CULG				0409						IIIB,W
			CULG				0509.5	0512	1				IIIGG
	0409	1842	WEIS				0509.8	0511.6	2				IIIG
			WEIS				0529.5	0529.7	1				IIIG
			CULG				0529.5	0530	1				IIIG
			WEIS				0604.2	0604.5	1				IIIG
	0430	1821	DURN	0604.4	0604.7	1	0604.4	0604.7	1				IIIG
			CULG	0604	0605	1							IIIG
			WEIS				0637.3	0640.7	3				IIIGG,RS
			CULG				0637.5	0642	3				IIIGG,V,UN
			CULG	0637.5	0639	1							RD
			DURN				0637.5	0640.5	3				IIIGG,V
			CULG	0639.5	0640.5	1							FAST DRIFT
			WEIS				0658.3	0658.4	1				IIIB
	0854	0945	MANI										
			WEIS				0933.8	0938.5	1				IIIG
			DURN				1048.0	1048.0	1				III
			WEIS				1532.2	1533.2	1				IIIG
			WEIS				1537.9	1538.1	1				IIIB
			WEIS				1618.3	1622.7	1				IIIG
			WEIS				1746.6	1746.7	1				IIIB
			WEIS				1801.8	1802.0	1				IIIG
			DURN				1802.0	1802.3	2				IIIG
	0914	2420	SGMR				1856.4	1857.7	1				IIIG
	2126	2400	MANI										
	2100	2400	CULG	2229	2340.5	1							IN
			CULG				2250.5	2252					IIIG,W
02	0000	0950	MANI										
	0000	0703	CULG	0145	0235.5								IS,W
			CULG				0149	0151.5	1				IIIG,U
			CULG				0216						IIIB,W
			CULG				0217.5	0218.5					IIIG,W
			CULG				0457	0507					IIIN,W
			CULG				0616	0643.5					IIIN,W
	0410	0740	WEIS				0618.6	0619.6	2				IIIG
			CULG				0618	0620	1				IIIG,U
			CULG				0630.5	0640.5	1				IS
			WEIS				0631.2	0631.4	1				IIIG
			CULG				0631	0631.5	1				IIIG
			WEIS				0634.7	0635.2	1				IIIG
			CULG				0635	0643	1				IIIG
			WEIS				0637.1	0637.3	1				IIIG
	0809	1842	WEIS				0957.1	0957.4	1				IIIG
	0429		DURN	1128.5	1129.5	1							IIIG
			DURN	1320	1755 D	1							I
			WEIS				1402.8	1422.6	3				IIIGG/V
	0914	2420	SGMR				1403.8	1414.0	3				IV
			SGMR				1414.0	2250.0	1				CONT
			WEIS				1457.6	1503.8	3				IIIG/V
			WEIS				1523.6	1523.7	1				IIIB
			WEIS				1611.9	1612.3	2				IIIG
	2058	2400	CULG	2147.5	2149.5	1							FAST DRIFT
	2219	2400	MANI										
			CULG				2232		1				IIIB
			CULG				2309	2400					IIIN,W
03	0000	0703	CULG	0003.5	0004	1							IIIG
			CULG				0026.5	0027.5	1				IIIG,U
			CULG				0028		1				IIIB,U
			CULG				0033	0044					IIIN,W
			CULG				0036	0039	2	0037	0038.5	2	IIIGG,V,SL

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JULY 1978

JUL 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
03	0000	0958	MANI							0037.0	0037.6	1	III
			CULG				0310	0657					IIIN,W
			CULG	0342.5	0343	1	0342.5	0343.5	2				IIIG,U
	0410	1320	WEIS				0446.3	0446.4	1				IIIB
			WEIS				0507.3	0507.6	2				IIIG
			CULG				0507.5	0508	2				IIIG,U
			WEIS				0613.5	0617.8	3				IIIGG/V
			CULG				0613	0618	2				IIIGG,REVE
	0430	1821	DURN	0620.0	0624	1	0620.0	0624	1				DCIM
			CULG	0620.5	0624	1	0619.5	0626.5	1				IIIGG
			CULG	0620.5	0624	1	0614.5	0641	1				IV
			WEIS				0620.5	0630.0	1				IIH B
			WEIS				0620.6	0631.0	2				IIIG
			CULG				0624.5	0641	2				II
			WEIS				0635.8	0641.5	1				II
			WEIS				0635.9	0641.5	2				IIIG
			CULG				0636	0641	1				IIIGG
			WEIS				0656.7	0656.8	1				IIIB
	0915	2420	SGMR										
	1408	1842	WEIS										
	2058	2400	CULG										
	2200	2400	MANI										
04	0000	0950	MANI										
	0000	0703	CULG										
			CULG	0227									IIIB,W
	0431	1820	DURN										
	0412	1842	WEIS				1452.7	1452.9	2				IIIB
	0915	2419	SGMR				1453.1	1453.4	1				III
			WEIS				1603.7	1604.4	1				IIIG
	2058	2400	CULG				2225.5	2227	2				IIIG,U
			CULG				2335	2339.5					IIIG,W,U
			CULG				2339.5		1				UNCLF
			CULG				2341	2341.5	1				IIIG,RS
			CULG				2346.5	2400	2	2349.5	2352	2	II, HB
	2152	2400	MANI							2346.5	2351.2	1	IIIG
05	0000	0950	MANI										
	0000	0703	CULG				0000	0003.5					II
			CULG				0011						IIIB,W
			CULG				0014	0015					IIIG,W
			CULG				0144						IIIB,W
	0411	0525	WEIS										
			CULG	0552	0630								IN,W
	0916	2419	SGMR				1154.7	1155.0	1				V
	0431	1818	DURN	1154	1205	2	1154	1205	2				DCIM,II
			SGMR				1200.5	1545.0	1				CONT
			DURN	1259.8	1301	1							DCIM
	0743	1842	WEIS				1530.2	1530.6	2				IIIG
			DURN	1530.6	1530.7	2	1530.6	1530.7	3				IIIG
			SGMR				1530.7	1531.0	3				III
			WEIS				1555.2	1555.5	2				IIIB
			SGMR				1807.5	1815.2	1				II
			SGMR				1808.0	2020.0	1				CONT
	2058	2400	CULG				2059	2400					IIIN,W
			CULG				2127.5	2131.5					POSSII,W
			CULG				2150	2151	1				UNCLF
	2150	2400	MANI										
			CULG				2220.5		1				IIIB
			CULG				2227	2228	2				IIIG,V,SLO
			CULG				2232		1				IIIB
			CULG				2233		1				IIIB
			CULG				2352.5	2354	1				IIIG
06	0000	0710	CULG				0051	0052					IIIG,W
			CULG				0109	0110.5	1	0109	0109.5	1	IIIGG
			CULG				0111	0111.5	1	0111	0111.5	1	IIIG
	0000	0945	MANI							0112.0	0112.2	1	III
			CULG	0112		1	0112	0112.5	2	0112	0112.5	2	IIIB
			CULG	0113.5	0114	2	0113.5	0114	1	0114	0114.5	1	IIIG

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JUL 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
06			CULG				0117.5	0118.5	2				IIIG
			CULG				0150.5	0151		0150.5			IIIG,W
			CULG				0402	0710					IS,W
			CULG				0403	0710					IIIN,W
	0413	1330	WEIS										
			CULG				0603	0604.5	1				UNCLF
	1442	1548	WEIS				1511.7	1512.3	2				IIIG
	0432	1802	DURN	1511.8	1512.3	2	1511.8	1512.3	2				III,V
	0917	2419	SGMR				1512.1	1515.0	3				V
			WEIS				1528.9	1536.5	3				V
			DURN	1529.0	1534.0	2	1529.0	1535.0	3				IC,II
			SGMR				1529.9	1542.4	3				IV
			WEIS				1535.5	1547.5	3				IIIGG
			SGMR				1542.4	1712.0	1				CONT
			WEIS				1542.7	1557.0	2				II
	1551	1841	WEIS										
	2037	2400	CULG				2057	2059.5	2				UNCLF
			SGMR				2058.2	2111.0	3				IIIG
			CULG				2109	2357					IIIN,W
			CULG				2133.5	2134	1				IIIG
			CULG				2135	2136	1				IIIG
	2150	2400	MANI										
			CULG				2158		1				IIIB
			CULG				2205.5		2				IIIB
			CULG				2300.5	2309	2				IIIGG
07	0000	0736	CULG				0021.5	0023.5	2	0022		1	IIIG
			CULG				0135	0454					IIIN,W
	0000	0715	MANI							0153.2	0153.5	1	III
			CULG				0153	0153.5	3	0153	0153.5	1	IIIB,V
			CULG				0156.5	0157	1				IIIG
			CULG	0228		1							IIIB
			CULG				0410	0410.5	2				IIIG
			CULG	0533.5	0536	2	0533.5	0545	1				II, HB
	0413	1841	WEIS				0533.6	0544.0	2				II
			CULG				0534	0633					IIIS,W
			CULG							0535	0555	1	S.W.F.
			WEIS				0536.7	0541.0	3				IIIGG,RS
			MANI							0537.8-	0540.9	1	IIIG
			CULG				0537	0549	1				IV
			CULG	0539.5	0541.5	2							FAST DRIFT
			WEIS				0546.9	0551.7	2				IIIG
			CULG				0547	0547.5	2				IIIG
			CULG				0549	0556	2				IV
			CULG				0556	0645	1				IV
			WEIS				0629.0	0630.1	1				IIIG
			WEIS				0725.7	0727.0	1				IIIB
			WEIS				0933.4	0939.5	3				IIIGG/V
	0614	1820	DURN	0933.8	0935.3	1	0933.8	0935.3	2				IIIG
	0917	2419	SGMR				0934.0	0936.3	3				V
			WEIS				0938.0	0950.0	2				IV
			DURN	0938.7	0946.0	3	0938.7	0950.0	3				IC,DCIH
			WEIS				1014.3	1015.8	2				IIIG
			WEIS				1117.3	1119.5	1				IIIG
			SGMR				1812.0	1945.0	1				CONT
	2037	2400	CULG				2104	2213	1				IS,C
	2150	2400	MANI										
			CULG				2204	2339					IIIN,W
			CULG				2213	2400	1				IIS
			CULG				2301	2301.5	1				IIIG
			CULG	2305.5	2306	1	2305.5	2307	2				IIIG,V
			CULG				2309.5	2310.5					IIIG,W
08	0000	0737	CULG				0000	0128.5	1				IS
	0000	1001	MANI										
			CULG				0026	0705					IIIN,W
			CULG	0045.5	0047.5		0045.5	0046.5					IIIG,W
			CULG				0057		1	0057		1	IIIB
			CULG				0118.5		1				IIIB
			CULG				0128	0224	2				IS

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JUL 1978	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
08			CULG	0217.5	0218	1	0217.5	0218	2				IIIG
			CULG				0224	0712	1				IS
			CULG	0231	0251	1							IS
			CULG				0253.5	0254	2	0253.5	0254	1	IIIB
			CULG	0301	0303	2	0301	0303	2				IIIG,U
			CULG	0303	0306	1	0306		1				IIIG
			CULG				0305	0705	1				IIIN
			CULG	0330	0710								IN,W
			CULG	0428.5	0429.5	1							IIIG
			DURN	0443.8	0443.8	2	0443.8	0443.8	2				III
	0433	1817	DURN	0443	1817 D	1	0443	1817 D	1				IC,OC
			DURN	0451.3	0451.3	1							III
	0506	1840	WEIS				0541.8	0542.9	1				IIIB
			DURN				0542.2	0542.2	3				III
			WEIS				0544.8	0546.1	2				IIIB
			DURN	1241.1	1241.2	3	1241.1	1241.2	3				IIIG
			WEIS				1448.2	1449.3	1				IIIB
			WEIS				1619.7	1620.4	2				IIIG
			WEIS				1652.2	1652.8	2				IIIG
			WEIS				1747.0	1824.0	2				IS
	0918	2418	SGMR				1835.5	1859.4	2				IIIG
			SGMR				1954.2	1957.1	3				V
			SGMR				1958.0	2019.0	2				IIIG
			SGMR				2019.0	2230.0	1				CONT
	2037	2400	CULG				2101	2159					IIIN,W
			CULG	2106.5	2234.5	1	2110	2325	1				IS,DC
			CULG				2106	2241	1				IV
			CULG				2106	2111	1				POSSIBLEII
			CULG				2159	2215	1				IIIS
			CULG				2215	2400					IIIS,W
			CULG	2234.5	2400	1							IS
	2150	2400	MANI							2313.4	2313.6	1	III
			CULG				2325	2400	2				IS,DC
09	0000	0737	CULG	0000	0030	1	0000	0304	2				IS,DC
			CULG				0000	0610					IIIN,W
			CULG	0030	0115	1							IS
			CULG	0115	0620	1							IN
			CULG				0138.5	0155.5	1				IIIGG
	0000	0948	MANI							0145.9	0148.4	1	IIIG
			CULG	0148	0150	1	0144.5	0150	3	0145	0150	2	IIIGG
			CULG				0427.5	0430					IIIGG,W
			CULG	0432.5	0434.5								IIIG,W
			CULG				0432	0434	1				IIIG
			CULG	0433.5		2							IIIG
			DURN				0433.6	0433.7	2				IIIG
	0433	1820	DURN	0433 E	1820 D	1	0433 E	1820 D	1				IC,DC
			CULG				0442	0446.5	2	0442	0446	2	IIIGG
			MANI							0500.5	0500.6	1	III
			CULG	0508.5		1	0508.5	0509.5	2				IIIG
			MANI							0508.9	0509.0	1	III
	0517	1102	WEIS				0521.4	0522.1	2				IIIG
			CULG				0521.5	0522.5	3				IIIG,V,U
			MANI							0522.0	0522.2	1	III
			WEIS				0542.1	0542.3	1				IIIG
			WEIS				0548.0	0548.4	2				IIIG
			MANI							0548.8	0549.0	1	III
			CULG	0548	0548.5								IIIG,W
			CULG				0548	0548.5	2				IIIG
			WEIS				0552.6	0554.2	3				IIIG
			CULG	0553		1	0553	0554.5	1				IIIG
			CULG	0611									IIIB,W
			DURN	0612.6	0612.6	2							IIIG
			CULG				0619	0713					IIIS,W
			CULG	0620	0713	1							IS
			WEIS				0633.5	0637.3	1				IIIG
			WEIS				0659.3	0659.4	1				IIIB
			WEIS				0704.8	0719.3	3				IIIGG
			CULG				0705	0714	1				IIIGG
			DURN	0707.1	0717.1	2	0707.1	0717.1	3				IIIGG

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JUL 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
09			CULG	0707		2	0707		2				IIIB
			MANI							0712.6	0713.3	1	III
			CULG	0712	0713	2	0712	0713.5	2				IIIG,V
			WEIS				0719.6	0726.0	2				II
			WEIS				0915.1	0920.8	3				IIIGG
			DURN				0915.9	0920.3	2				IIIG
			WEIS				1008.3	1019.5	3				IIIGG
	0919	2418	SGMR				1008.9	1020.2	1				IIIG
			DURN	1009.4	1013.4	2	1009.4	1013.4	2				IIIG
			WEIS				1015.0	1021.0	3				II
			WEIS				1023.6	1023.9	2				IIIG
			DURN				1115.6	1115.6	3				IIIG
			WEIS				1140.8	1900.0	2				IS
	1121	1900	WEIS				1145.3	1148.0	3				IIIG
			SGMR				1145.9	1147.0	3				V
			WEIS				1201.8	1202.0	2				IIIG
			DURN	1212.4	1213.4	2	1212.4	1213.4	2				IIIG
			WEIS				1220.0	1445.0	3				IV
			SGMR				1221.5	1225.9	2				II
			WEIS				1222.5	1225.5	2				II
			SGMR				1224.1	1554.0	2				IV
			DURN	1232.1	1232.3	2							III
			DURN	1236.3	1240.2	2							IIIG
			SGMR				1554.0	2418.0D	1				CONT
			WEIS				1647.2	1649.7	3				IIIG
			SGMR				1647.7	1649.3	3				V
			DURN	1647.7	1648.3	2	1647.7	1648.3	2				DCIM
			DURN	1704.1	1704.1	2							IIIG
			DURN				1755.0	1756.2	2				IIIG
			WEIS				1755.6	1756.3	1				IIIG
			WEIS				1832.0	1839.2	3				IIIGG
			SGMR				1832.8	1925.0	3				IV
	2037	2400	CULG	2104	2400								IN,W
			CULG				2106.5	2400					IS,W
			CULG				2112	2400					IIIN,W
			CULG	2143.5	2144	1							IIIG
	2145	2400	MANI										
			CULG				2156.5		2				IIIB
			CULG				2201	2201.5	1				IIIG
			CULG	2244	2244.5								IIIG,W
			CULG	2246.5	2247	2							IIIG
10	0000	0737	CULG				0000	0448					IIIN,W
			CULG	0037	0613		0020	0448					IN,W
			CULG							0141	0344	1	S.W.F.
			CULG				0310	0310.5	2	0310.5	0311	1	IIIG
			CULG				0316	0317	3	0316.5	0317	1	IIIG
	0435	1820	DURN	0435 E	1820 D	1	0435 E	1820 D	1				IC,DC
			CULG				0448	0730					IS,W
			CULG				0448	0521					IIIS,W
	0517	0522	WEIS				0519.9	0522.0	1				IIIG
	0000	0947	MANI							0521.4	0523.5	1	IIIG
			DURN	0521.9	0524.5	1	0521.9	0524.5	3				DCIM,IIIG
			CULG	0522	0524	2	0521	0525	3				IIIGG,V
			CULG				0530.5	0543.5	1				II
			CULG							0612	0715	1	S.W.F.
			CULG	0613	0715	3	0613	0730	3				IV
			DURN	0613	0810	3	0613	0810	3				IV, F
	0533	0745	WEIS				0614.7	0618.5	3				IIIGG
			CULG				0615	0615.5	1				IIIG
			CULG				0616	0617	1				IIIG
			WEIS				0618.0	0745.0	3				IV
			CULG				0620.5	0622.5	3				IIIGG,V
			MANI							0622.0	0629.2	1	IV
			CULG				0622.5	0630	3	0625	0627.5	3	II
			CULG				0630	0643	2				IIIS
			MANI							0641.0	0727.2	1	CONT
			WEIS				0825.0	1843.0	3				IIIS
	0825	1843	WEIS				0825.0	1843.0	3				ISDC
	0919	2417	SGMR				1032.5	2417.0D	2				CONT

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JUL 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
10			SGMR				1304.0	1305.1	3				V
			WEIS				1530.0	1843.0	1				CONT
			WEIS				1653.3	1655.8	3				IIIGG
			DURN	1653.7	1654.5	3	1653.7	1654.5	3				IIIG
			SGMR				1653.8	1730.0	2				IIIS
			SGMR				1730.0	1736.0	3				IIIG
			WEIS				1730.2	1737.2	3				IIIGG
			DURN	1731.7	1738.6	3	1731.7	1738.6	3				IIIG,DCIM
			SGMR				1736.0	1738.6	3				IV
			WEIS				1819.7	1821.3	3				IIIG
			SGMR				1820.2	1821.9	3				IIIG
			SGMR				1859.8	1900.4	3				V
			SGMR				2018.2	2021.0	3				V
	2037	2400	CULG				2101	2400	2				IIIS
			CULG				2103	2400	2				IS,C
			CULG	2116	2117.5	2	2116	2117.5	2				IIIG
			CULG	2117	2400	1							IIIN
			CULG	2119	2120	2	2119	2120	1				IIIG
			CULG	2134	2136	2							IIIGG
	2144	2400	MANI										
			CULG				2225	2225.5	3				IIIG
			SGMR				2227.2	2227.5	3				V
			CULG				2227	2227.5	3				IIIG
			CULG	2327.5	2329.5	2	2328	2329	3	2328	2328.5	2	IIIG
			CULG				2341.5	2342	1	2341.5	2342	1	IIIG
			CULG				2355.5	2356	3	2355.5	2356	1	IIIG
11			CULG				0000	0222.5	2				IS,C,DC
	0000	0737	CULG				0000	0054	2				IIIS
			CULG				0036	0036.5	1	0036	0036.5	1	IIIG
			CULG				0046.5	0048	3	0046.5	0047.5	3	IIIG,V
	0000	0950	MANI							0046.5	0047.0	2	III
			CULG				0049.5	0050	1	0049.5	0050	1	IIIG
			CULG				0054	0136	2				IIIS
			CULG							0055	0120	1	S.W.F.
			MANI							0122.8	0125.8	2	IIIG
			CULG	0123	0127	3	0122.5	0126.5	3	0123	0126	3	IIIGG
			CULG				0128	0139	1				II
			CULG				0128	0129.5	3	0128.5	0129	2	IIIG
			CULG				0136	0448	1				IIIS
			CULG				0153.5	0448	1				IIIN
			CULG				0213.5	0214	2				IIIG
			CULG				0222	0630	2				IS,DC
			CULG	0224	0225.5	1							FAST DRIFT
			CULG				0313	0316	2				IIIGG
			CULG	0336	0347.5	3	0336	0346.5	3	0336	0346	3	IIIGG,V
			CULG	0338.5	0339	1							UNCLF,SLOW
			CULG				0343.5	0354.5	1				II
			MANI							0347.5	0350.2	2	IIIG
			CULG	0349	0349.5	1	0349	0351	3				IIIGG
			CULG	0427	0439	1							IV
	0408	1407	WEIS				0428.3	0453.0	3				II
			CULG	0428.5	0431.5	3	0428.5	0450.5	3	0436	0438.5	2	II, HB
	0428		DURN				0428.7	0429.4	3				II
			WEIS				0428.8	0430.3	3				IIIG
			CULG							0428	0555	1	S.W.F.
			MANI							0429.4	0429.5	1	III
			CULG				0429	0430.5	3	0429	0429.5	1	IIIG
			CULG				0438	0522	1				IV
			MANI							0439.0	0443.0	1	IIIG
			CULG				0448	0654	1				IIIS
			WEIS				0456.3	0505.7	2				IIIG
			DURN	0458	0511 D	1	0458	0511 D	1				IC
			WEIS				0512.6	0512.8	2				IIIB
			CULG				0545	0545.5	1				IIIB,V
	0550	1818	DURN	0550 E	1818 D	1	0550 E	1818 D	1				IC
			CULG				0630	0710	1				IS,DC
			WEIS				0701.3	0707.8	3				IIIGG
			MANI							0702.1	0702.3	1	III
			CULG	0703	0708.5	2	0701	0708.5	2				IIIGG

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JUL 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
11			DURN	0708.0	0708.2	2	0708.0	0708.2	3				IIIG
			DURN	1051.3	1250	3	1052.4	1250	3				IV, F
			WEIS				1051.3	1407.0	3				IV
			WEIS				1051.3	1059.0	3				II
			WEIS				1051.9	1054.5	2				IIIG
	0920	2417	SGHR				1053.4	1059.3	2				IIIG
			SGHR				1059.3	1352.2	3				IV
			SGHR				1352.2	1615.5	2				IV
			SGHR				1352.2	2417.00	2				IIIS
			WEIS				1424.0	1843.0	3				IIIS
	1424	1843	WEIS				1424.0	1843.0	3				IS
			WEIS				1611.3	1631.5	3				IIIGG
			SGHR				1611.3	1631.4	3				V
			DURN	1612.0	1613.0	2							OCIM
			DURN	1617.1	1646.3	3	1617.1	1646.3	3				IIIG,N
			SGHR				1621.5	2013.0	2				IV
			WEIS				1657.3	1659.5	3				IIIGG
			SGHR				1658.8	1659.2	3				V
			DURN	1658.9	1659.5	3	1658.9	1659.5	3				OCIM
			WEIS				1724.8	1725.0	2				IIIB
			DURN	1725.2	1725.2	2							III
			WEIS				1802.3	1802.7	3				IIIG
			WEIS				1824.0	1824.9	3				IIIG
			WEIS				1842.2	1842.5	2				IIIG
			SGHR				2005.9	2006.5	3				V
	2037	2400	CULG				2103	2400	2				IS,C
			CULG	2104	2400	1							N,FASTORIF
			CULG				2110	2400	1				IIIS
			CULG				2140.5	2400	2				IIIN
			CULG	2205	2206.5	1	2205	2206	3	2205	2205.5	2	IIIG,V
			CULG							2228	2330	1	S.W.F.
			CULG	2236	2400	1							IIIG,N
			CULG	2301.5	2304.5	2	2301.5	2303.5	3				IIIGG,V
	2140	2400	MANI							2301.8	2302.6	1	IIIG
			CULG				2319.5	2320	1	2319.5	2320	1	IIIG
			CULG	2358.5	2359	2	2358.5	2359.5	3	2359	2359.5	2	IIIG
			MANI							2358.9	2359.3	2	III
12	0000	0737	CULG				0000	0145	2				IS,C
			CULG				0000	0258	1				IIIS
			CULG				0007.5	0228	2	0013	0228	1	IIIG,N
			CULG	0013	0601	1							N,FASTORIF
			CULG	0013	0013.5	3	0013	0013.5	2	0013	0013.5	1	IIIG
	0000	1002	MANI							0042.3	0051.5	2	IIIG
			CULG	0042	0050	1							IIIG
			CULG	0050	0053	2	0042	0052	3	0042	0052	3	IIIGG,V
			CULG	0059.5	0104	1	0059	0104	3	0059.5	0104	3	IIIGG,V
			MANI							0059.7	0104.0	2	IIIG
			CULG				0145	0551	2				IS,DC
			CULG				0215.5	0228	3	0215.5	0227.5	3	IIIGG
			MANI							0215.8	0220.3	2	IIIG
			CULG							0250	0313	1	S.W.F.
			CULG				0258	0716	2				IIIS
			MANI							0300.3	0301.5	2	IIIG
			CULG				0300	0710	3	0300	0549	3	IIIG,N
			MANI							0308.0	0308.2	1	III
			MANI							0313.4	0313.9	1	III
			MANI							0317.0	0317.1	1	III
			MANI							0329.5	0329.7	1	III
			MANI							0331.4	0331.8	1	III
			MANI							0335.9	0336.0	1	III
			MANI							0340.4	0343.7	1	IIIG
	0408	1843	WEIS				0409.0	1559.0	2				INDC
			WEIS				0416.0	1838.7	3				IIIN
			MANI							0419.1	0419.3	1	III
			MANI							0428.0	0428.3	1	III
	0430	1821	DURN	0430 E	1821 D	1	0430 E	1821 D	1				IC,DC
			MANI							0443.4	0443.9	1	III
			DURN	0501.6	0505.6	3	0501.6	0505.6	3				IIIG
			MANI							0508.6	0510.0	1	III

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JUL 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
12			MANI							0523.0	0523.3	1	III
			MANI							0536.9	0537.0	1	IIIG
			MANI							0545.9	0548.3	1	IIIG
			CULG				0551	0716	2				IS,C,DC
			DURN	0556.8	0600.7	3	0556.8	0600.7	3				IIIG,DCIM
			MANI							0625.7	0625.9	1	III
			MANI							0709.0	0710.0	1	III
			MANI							0713.8	0714.0	1	III
			MANI							0736.2	0736.9	1	III
			MANI							0742.4	0742.8	1	III
			MANI							0822.3	0822.7	1	III
	0921	2416	SGMR				0925.5	1031.5	2				IIIS
			DURN	1006.1	1014.2	2	1006.1	1014.2	3				IIIG
			SGMR				1143.9	1150.6	3				V
			SGMR				1150.6	1331.9	2				IIIS
			SGMR				1150.6	1331.9	2				IIIS
			DURN				1207.9	1212.6	3				IIIGG
			WEIS				1208.3	1212.3	3				IIIGG
			SGMR				1209.0	1210.9	3				V
			SGMR				1209.0	1210.9	3				V
			SGMR				1221.8	1225.1	3				V
			SGMR				1228.8	1230.6	3				V
			DURN				1238.1	1238.6	3				IIIG
			SGMR				1240.0	2416.0D	3				IIIS
			DURN	1307.0	1337.4	3	1307.0	1337.4	3				IIIG,N
			SGMR				1331.9	2416.0D	2				CONT
			DURN	1452.9	1459.5	2	1452.5	1459.5	3				IIIGG
			DURN	1530.5	1530.5	3	1530.5	1530.5	3				III
			SGMR				1556.0	1607.0	3				IIIG
			WEIS				1559.8	1603.8	3				IIIGG/V
			DURN	1601	1606.5	3	1601	1606.5	3				IIIG,DCIM
			WEIS				1604.7	1606.6	3				IIIG/V,RS
			WEIS				1758.8	1802.3	3				IIIG/V
			DURN	1759.4	1800.9	3	1759.2	1800.9	3				IIIG,DCIM
			SGMR				1759.8	1801.2	3				IIIG
	2037	2400	CULG				2103	2400	2				IS,C
			CULG				2114	2400					IIIS,W
			CULG	2117	2117.5	1	2116	2119.5	2				IIIGG,V
			CULG				2127	2400	2				IIIG,N
			CULG				2133	2134.5	3				IIIG,V
			CULG				2212.5	2213	2				IIIB,U
	2204	2400	MANI							2302.9	2306.1	1	IIIG
			MANI							2309.0	2309.1	1	III
			MANI							2320.0	2320.3	1	III
			MANI							2322.0	2322.3	1	III
			MANI							2344.6	2344.8	1	III
13	0000	0737	CULG				0000	0327	1				IS,C,DC
			CULG				0000	0704	1				IIIS
	0000	0952	MANI							0019.7	0020.7	2	III
			CULG	0019	0019.5	1	0019	0021	3	0019.5	0021	3	IIIG,V
			CULG	0058		1							IIIB
			CULG				0211.5	0212	2				IIIG
			CULG	0236	0236.5	1							FAST DRIFT
			CULG				0304	0304.5	2	0304	0304.5	1	IIIB
			CULG				0327	0706	1				IS,DC
			CULG	0409.5	0411	1							FAST DRIFT
	0430	1820	DURN	0430 E	1820 D	1	0430 E	1820 D	1				IC
			DURN	0502.7	0502.7	2							III
	0409	1551	WEIS				0517.0	0713.0	1				IIIN
			DURN	0734.0	0734.2	3	0734.0	0734.2	3				IIIG
			DURN	0811.2	0811.4	3	0811.2	0811.4	3				IIIG
			WEIS				0811.5	0811.6	2				IIIG
			DURN	0837.1	0837.3	2							IIIG
			WEIS				0900.5	0900.8	2				IIIG
			WEIS				1451.1	1452.2	2				IIIB
			DURN	1511.0	1511.2	2							IIIG
	0922	2416	SGMR				1630.2	1630.4	1				III
			SGMR				1722.8	1722.9	1				III
	2038	2400	CULG				2117	2319					IIIN,W

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JUL 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
13			CULG				2134	2400	1				IN
	2142	2400	MANI										
			CULG				2151.5		1				IIIG
			CULG				2254	2255					IIIG,V,W
			CULG				2309.5		2				IIIB
			CULG	2329	2331.5	1	2329	2331.5	1				IIIG
			CULG	2336	2336.5	1	2336	2336.5	1				IIIG
			CULG	2348.5	2349	1	2348.5	2349	1				IIIG
14	0000	0737	CULG				0000	0233	1				IN
	0000	0951	MANI										
			CULG				0035	0626					IIIN,W
			CULG	0133	0134	1	0133	0134	2				IIIG,U
			CULG				0236.5	0237	1				IIIG
			CULG	0316.5	0317.5	1	0316.5	0317	1				IIIG
	0430	1817	DURN	0430 E	1817 D	2	0430 E	1817 D	2				IC
			CULG	0527	0527.5		0527	0527.5					IIIG,W
			CULG	0612.5	0613.5	2	0612.5	0613	1				IIIGG
			CULG	0640	0641	1							IIIG
	0409	1158	WEIS				0810.3	0810.5	1				IIIB
			WEIS				0843.5	0843.6	1				IIIB
			WEIS				1012.7	1012.8	1				IIIB
			WEIS				1105.1	1105.9	2				IIIG
	0922	2415	SGMR				1105.4	1105.6	1				III
	1213	1842	WEIS				1322.4	1322.6	2				IIIU
			WEIS				1331.7	1331.8	2				IIIRS
			DURN	1331.7	1331.9	3	1331.7	1331.9	3				IIIG
			WEIS				1337.9	1338.2	1				IIIB
			WEIS				1345.2	1345.4	1				IIIB
			SGMR				1345.4	1345.6	1				III
			WEIS				1513.7	1513.9	2				IIIRS
			WEIS				1535.4	1536.9	3				IIIG
			SGMR				1535.5	1536.7	3				IIIG
			DURN				1559.0	1559.4	3				IIIG,U
			WEIS				1559.1	1559.3	2				IIIU
			WEIS				1729.3	1729.4	2				IIIG
			WEIS				1731.3	1736.5	3				IIIGG/V
			SGMR				1731.4	1735.4	3				V
			WEIS				1736.7	1747.5	3				II
			SGMR				1736.9	1746.0	3				II
			WEIS				1800.3	1800.5	1				IIIB
			CULG	2106	2106.5	1							IIIG
	2038	2400	CULG				2106	2400					IIIN,W
			CULG				2114	2400					IN,W
	2140	2400	MANI										
			CULG	2158.5	2159	1							FAST DRIFT
			CULG	2208.5		1							IIIB
			CULG	2215.5	2216.5		2215.5	2216.5					IIIG,W
15	0000	0738	CULG				0045	0655					IIIN,W
			CULG	0054	0055.5	3	0054	0055.5	3				IIIGG,V
			CULG							0054	0120	1	S.W.F.
			CULG	0149	0149.5	2	0149	0149.5	2				IIIG
			CULG				0350.5	0435.5	2				II
			CULG	0403.5	0405	2	0404.5	0405	1	0406	0406.5	1	IIIGG
	0000	1002	MANI							0405.8	0408.4	1	III
	0430	0516	DURN										
			CULG				0525.5	0531	1				IIIGG
	0410	0857	WEIS				0526.2	0529.2	1				IIIG
	0919	1842	WEIS				1055.4	1125.1	2				IIIGG
			WEIS				1305.5	1306.3	2				IIIG
	0923	2415	SGMR				1424.0	1431.5	3				V
			WEIS				1424.4	1429.5	3				IIIG/V,RS
			WEIS				1433.0	1344.4	1				IIIG
			WEIS	1445.7	1445.8	2							IIIG
	1631	1821	DURN										
	2138	2400	MANI										
	2038	2400	CULG				2214	2217					IIIG,W
			CULG				2247.5						IIIB,W
16	0000	0305	MANI										

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JUL 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
16	0000	0737	CULG				0106	0107.5					IIIG,W
			CULG				0127	0130					IIIGG,W
			CULG				0129	0129.5	1	0129	0129.5	1	IIIG
			CULG				0315.5	0344	2				II
			CULG				0317	0433					IIIN,W
			CULG				0421.5	0422.5	2				IIIG,U
	0412	1501	WEIS				0421.8	0422.5	1				IIIUU
			WEIS				0430.6	0432.4	3				IIIGU
	0307	0940	MANI							0430.9	0431.5	1	III
			CULG	0431	0431.5	1	0431	0432.5	3				IIIGG,V
	1432	1820	DURN	0432 E	1820 D	1	0432 E	1820 D	1				IC,DC
			CULG				0707.5	0711	1				IIIG
			WEIS				0708.4	0708.6	2				IIIU
			WEIS				0719.8	0721.3	2				IIIG
			WEIS				0941.3	0941.4	1				IIIB
	1516	1842	WEIS										
	0924	2414	SGMR				2004.8	2005.0	2				III
	2039	2400	CULG	2117.5	2118	1	2117.5	2118	1				IIIG
			CULG				2119	2120					IIIG,W
			CULG				2139.5	2157.5	1				IS
	2149	2210	MANI										
			CULG				2153						IIIB,W
			CULG				2305	2305.5	2				IIIG
	2306	2400	MANI										
			CULG	2349	2351.5		2349	2352					IIIG,W
17	0000	0738	CULG	0012.5	0020.5	1							CONT.
			CULG				0014.5	0022.5					IIIGG,W
			CULG				0015.5	0016.5	1				IIIG,U
			CULG				0023.5	0051					II, W
			CULG				0025.5	0636					IIIN,W
			CULG				0035.5		1				IIIB
			CULG	0138.5	0139	1	0138.5	0139.5	1				IIIG
			CULG	0155.5	0156.5	1	0155.5	0156.5	1				IIIG
			CULG				0405	0406.5	1				IIIG
	0434	1817	DURN	0434 E	1817 D	1	0434 E	1817 D	1				IC
	0412	1833	WEIS				0505.4	0505.9	3				IIIB
			CULG				0505.5	0506.5	2				IIIB,V
	0000	0955	MANI							0505.8	0506.2	1	III
			WEIS				0519.4	0519.5	1				IIIG
			WEIS				0521.2	0521.3	1				IIIG
			DURN	0521.4	0521.9	3	0521.4	0521.9	3				IIIG
			CULG	0521	0522	1	0519.5	0521	1				IIIG
			WEIS				0557.3	0557.7	2				IIIG
			CULG				0557.5	0558	1				IIIG
			WEIS				0922.5	0936.5	2				II
			WEIS				1001.5	1001.9	1				IIIG
			WEIS				1300.1	1300.3	1				IIIB
			WEIS	1355.0	1355.3	2							IIIG
			WEIS	1427.7	1428.1	2							IIIG
			WEIS				1432.5	1432.6	1				IIIB
			WEIS				1537.0	1537.1	1				IIIB
			WEIS				1543.9	1544.0	2				IIIRS
			WEIS				1706.2	1706.3	2				IIIB
			WEIS				1710.0	1710.2	1				IIIB
			WEIS				1717.8	1717.9	1				IIIB
			WEIS				1741.1	1741.3	2				IIIB
	0925	2413	SGMR				1741.2	1741.4	1				III
	2038	2400	CULG				2127	2136.5	1				IIIGG
			SGMR				2130.0	2135.5	1				IIIG
			CULG				2133		2				IIIB
			CULG				2135		2				IIIB
	2145	2400	MANI										
			CULG				2207	2312					IIIN,W
			CULG				2303	2309	1				IIIG
			CULG				2303	2309	1				UNCLF,SLOW
18	0000	0148	MANI										
	0000	0738	CULG				0043	0049					IIIN,W
	0155	0953	MANI										

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

JULY 1978

JUL 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
18	0427	0716	WEIS										
	0438	1820	DURN	0438 E	1820 D	1	0438 E	1820 D	1				IC
			CULG	0547.5	0549.5	1							FAST DRIFT
			CULG				0657						IIIB,W
	0735	1833	WEIS										
	0926	2345	SGMR										
	2038	2400	CULG	2100	2137.5	1	2100	2400	2				IS,DC
			CULG				2108.5	2400					IIIN,W
			CULG				2122	2122.5	1				IIIB,U
			CULG	2137.5	2400								IN,W
	2150	2400	MANI										
			CULG	2346.5	2347	1	2346.5	2347	1				IIIG
19	0000	0738	CULG				0000	0214	1				IS,DC
	0000	0955	MANI										
			CULG				0059	0652					IIIN,W
			CULG	0141.5	0142	1							IIIG
			CULG				0214	0407					IS,W,DC
			CULG	0233	0234.5	1							FAST DRIFT
			CULG	0318	0404								IS,W
			CULG	0404	0458	1	0407	0438	1				IS,DC
			CULG				0438	0520					IS,W
	0438	1607	DURN	0438 E	1607 D	3	0438 E	1607 D	3				IC,DC
			CULG	0458	0715	1							IN
			DURN				0500.2	0500.7	3				IIIG
	0425	1340	WEIS				0500.3	0501.8	2				IIIG
			CULG	0500	0501	2							IIIG
	0927	2412	SGMR										
			WEIS				1051.9	1052.1	1				IIIG
	1355	1833	WEIS										
	2143	2400	MANI										
	2038	2400	CULG				2155	2155.5					IIIG,W
20	0000	0738	CULG				0012	0312					IIIN,W
			CULG							0013	0030	1	S.W.F.
			CULG	0029.5	0030	2	0029.5	0030	1				IIIG
			CULG				0056.5	0057	2				IIIG
			CULG				0107.5	0108	1				IIIG
			CULG				0209	0209.5	1				IIIG
	0000	0958	MANI							0232.1	0234.5	1	IIIG
			CULG	0232	0236.5	1	0230.5	0241.5	3	0232	0237	2	IIIGG
			CULG				0247	0436	1				IS
			CULG	0254	0626								IN,W
			CULG				0311	0315.5					IIIS,W
			CULG				0315.5	0323	2				IIIS
			MANI							0316.9	0322.0	2	IIIG
			CULG				0323	0340	1				IIIS
			CULG				0340	0405					IIIS,W
	0440	1818	DURN										
			CULG				0509	0550					IN,W
			CULG				0550	0715	1				IS
	0425	1832	WEIS				1147.9	1148.0	1				IIIB
			WEIS				1319.3	1320.1	2				IIIG
	0928	2411	SGMR				1319.4	1320.2	1				IIIG
	2039	2400	CULG	2126.5	2127.5	2	2126.5	2127.5	1				IIIGG
	2143	2400	MANI										
21	0000	0218	MANI										
	0000	0720	CULG				0003	0322					IIIN,W
	0219	0954	MANI										
			CULG				0320	0403					IS,W
	0425	0620	WEIS										
	0705	1038	WEIS										
	0928	2410	SGMR										
	1126	1832	WEIS				1203.4	1203.6	2				IIIG
	0440	1820	DURN	1245.8	1245.8	1	1245.8	1245.8	1				III
			DURN	1300	1820	2	1300	1820	2				IC,DC
			DURN	1426.2	1426.4	2	1426.2	1426.4	2				IIIG,U
			WEIS				1426.2	1426.6	1				IIIG
	2136	2400	MANI										

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

JULY 1978

JUL 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
21	2039	2400	CULG				2232	2400	1				IS
22	0000	0738	CULG				0000	0019	1				IS
			CULG				0008	0646					IIIN,W
			CULG	0009	0536								IN,W
			CULG				0011.5	0012	1	0011.5	0012	1	IIIB
			CULG				0019	0119					IN,W
			CULG				0119	0223					IS,W
			CULG				0223	0253	1				IS
			CULG				0253	0350					IN,W
			CULG				0424	0439					IIIS
	0426	1336	WEIS				0431.0	0431.7	1				IIIB E
			CULG				0431.5	0432	1	0431.5	0432	1	IIIG
	0000	0950	MANI							0437.4	0437.6	1	III
			CULG				0437.5	0438	2	0437.5	0438	2	IIIG
			WEIS				0437.7	0438.5	2				IIIG
	0450	1820	OURN	0450 E	1820	1	0450 E	1820	1				IC,DC
			WEIS				0943.0	0943.2	1				IIIB
			WEIS				1016.7	1017.3	3				IIIG
	0929	2409	SGMR				1016.9	1018.2	2				V
			OURN				1017.8	1017.8	2				III
			WEIS				1124.1	1128.7	2				IIIG
			WEIS				1126.0	1126.2	1				IIIB
			WEIS				1127.8	1128.1	1				IIIB
			SGMR				1224.3	1229.0	2				IIIG
			WEIS				1306.5	1306.6	2				IIIB
			WEIS				1320.6	1320.9	2				IIIG
			SGMR				1320.7	1321.0	1				V
	1351	1831	WEIS				1352.2	1352.7	1				IIIG
			WEIS				1400.5	1400.7	1				IIIB
			WEIS				1411.7	1411.9	2				IIIG
			SGMR				1411.8	1730.0	1				IIIS
			WEIS				1421.9	1423.4	2				IIIG
			WEIS				1443.2	1443.4	1				IIIB
			WEIS				1511.7	1512.8	1				IIIG
			WEIS				1649.2	1649.4	1				IIIB
			WEIS				1738.7	1744.1	2				IIIGG
			SGMR				1740.2	1740.8	1				IIIG
			WEIS				1753.2	1753.3	1				IIIB
	2038	2400	CULG				2144	2400					IIIN,W
			CULG				2236	2237	1				IIIG
			CULG				2309	2309.5	1				IIIG
			CULG	2338.5	2342	1	2338.5	2345	1				IIIGG
			CULG				2339.5	2342	2	2340	2342	2	IIIGG
	2130	2400	MANI							2340.1	2342.0	1	IIIG
23	0000	0738	CULG				0028.5	0032					IIIG,W
			CULG				0137						IIIB,W
			CULG				0145.5	0146	1	0146		1	IIIG
			CULG	0208	0209	1	0207	0209	1	0207	0207.5	1	IIIGG
			CULG				0234.5	0235.5	2	0235	0235.5	1	IIIG,V
	0000	0950	MANI							0234.8	0235.1	1	III
			CULG				0327	0327.5	1				IIIG
			CULG				0340	0342.5	1	0342	0342.5	1	IIIG
			MANI							0427.5	0427.8	1	III
			CULG	0427		1	0427	0428	3				IIIB,V
			CULG	0520.5		1							FAST DRIFT
	0440	1808	OURN	0520.6	0520.6	3	0520.6	0520.6	1				III
			CULG	0525.5	0526.5		0525.5	0526					IIIG,W
			CULG	0541.5	0542	1	0541	0542.5	1				IIIG
			OURN				0541.6	0541.6	2				IIIG
	0428	1829	WEIS				0541.7	0541.9	2				IIIG
			CULG				0549						IIIB,W
			CULG	0607.5	0608.5	1							FAST DRIFT
			WEIS				0751.4	0753.2	1				IIIG
			WEIS				0927.3	0930.9	2				IIIG
			WEIS				0945.5	0946.0	1				IIIG
			WEIS				0947.7	0947.8	1				IIIB
			WEIS				0950.7	0951.0	1				IIIB
			WEIS				0953.1	0953.4	1				IIIG

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

JULY 1978

JUL 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
23			WEIS				0955.8	0956.3	1				IIIG
			WEIS				1042.5	1043.0	1				IIIG
			WEIS				1125.9	1126.6	1				IIIG
			DURN	1200	1808	1	1200	1808	1				I
			WEIS				1425.0	1427.6	2				IIIG
	0930	2408	SGMR				1425.1	1427.7	3				V
			WEIS				1544.5	1546.2	1				IIIG
			WEIS				1723.0	1724.7	2				IIIG
			SGMR				1724.9	1725.0	1				III
	2038	2400	CULG				2059	2155	1				IS,DC
			CULG				2120	2216					IIIS,W
	2137	2400	MANI										
			CULG				2155	2241					IS,W
			CULG				2216.5	2400					IIIN,W
24	0000	0950	MANI										
	0000	0738	CULG				0316	0316.5					IIIG,W
			CULG				0318	0318.5	1				IIIG
	0430	0627	WEIS										
	0442	1820	DURN										
			CULG				0539						IIIB,W
	0714	1828	WEIS				1324.7	1325.8	2				IIIG
			WEIS				1354.3	1354.5	2				IIIB
			WEIS				1356.6	1357.1	3				IIIG
	2142	2400	MANI										
	2038	2400	CULG				2258						IIIB,W
			SGMR										
25	0000	0950	MANI										
	0000	0738	CULG	0016	0016.5								FAST DRIFT
			CULG	0020.5									FAST DRIFT
	0430	1331	WEIS										
	0450	1820	DURN										
	1402	1827	WEIS										
	1545	2407	SGMR										
	2038	2400	CULG										
	2144	2400	MANI										
26	0000	0115	MANI										
	0000	0730	CULG				0034	0035					IIIG,W
			CULG				0102.5	0103					IIIG,W
			CULG				0104	0105					IIIG,W
	0126	1003	MANI										
	0450	1818	DURN										
			CULG				0533.5	0534					IIIG,W
			CULG				0536	0536.5	1				IIIG
	0742	1826	WEIS										
	0933	2406	SGMR										
	2122	2400	MANI										
	2039	2400	CULG				2136	2141.5	2				IIIG
27	0000	0950	MANI										
	0000	0738	CULG				0152	0153					IIIG,W
	0431	1000	WEIS										
	0934	2405	SGMR										
	1006	1826	WEIS										
	0450	1810	DURN	1118.5	1119.3	1	1118.5	1119.3	1				IIIG
	2136	2400	MANI										
	2038	2400	CULG				2235.5	2236.5	1				UNCLF
28	0000	0955	MANI										
	0000	0738	CULG				0317.5	0318					IIIG,W
			CULG				0352	0352.5					IIIG,W
			CULG				0354.5	0358					IIIG,W
			CULG				0402.5						IIIB,W
			CULG				0409						IIIB,W
			CULG				0614	0617					IIIG,W
			CULG				0643.5	0644					IIIG,W
	0935	2404	SGMR										
	0433	1625	WEIS				1044.3	1045.4	1				IIIG

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

JULY 1978

JUL 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
28			HEIS				1137.3	1137.4	1				IIIB
	0450	1820	DURN				1410	1820	1				IC,DC
	1646	1825	HEIS										
	2038	2400	CULG										
	2146	2400	HANI										
29	0000	0958	HANI										
	0000	0738	CULG	0133.5	0139		0133	0140.5					IIIGG,W
			CULG				0218.5	0221.5					IIIG,W
	0434	1824	HEIS				0959.6	1003.4	2				IIIG
			HEIS				1543.4	1546.0	1				IIIG
	0936	2403	SGMR				1543.5	1546.0	2				V
	0450	1817	DURN	1718.4	1718.6	3	1718.4	1718.6	3				IIIG
	2038	2400	CULG	2111.5	2112.5		2111.5	2112.5					IIIG,W
	2145	2400	HANI										
30	0000	1005	HANI										
	0000	0738	CULG				0118	0657					III,W
	0450	1820	DURN										
	0435	0943	HEIS				0652.7	0652.8	1				IIIB
			HEIS				0741.3	0743.3	2				IIIG
	0937	2402	SGMR										
	0958	1823	HEIS										
	2135	2400	HANI										
	2038	2400	CULG	2251.5	2252	1							FAST DRIFT
31	0000	1000	HANI										
	0000	0738	CULG				0052						IIIB,W
			CULG				0056.5						IIIB,W
			CULG				0342.5						IIIB,W
			CULG				0355						IIIB,W
	0650	1820	DURN				0740	0900	1				IN
	0938	2400	SGMR										
	0435	1618	HEIS				1213.5	1213.7	2				IIIB
	1635	1830	HEIS										
	2038	2400	CULG	2116	2116.5		2116	2116.5					IIIG,W
	2139	2400	HANI										
			CULG	2156			2155.5	2156					IIIG,W,U

The symbols used in connection with the spectral type in describing the important bursts are as follows:

B = Single burst
G = Small group (< 10) of bursts
GG = Large group (> 10) of bursts
C = Underlying continuum (particularly with type I)
S = Storm in the sense of intermittent but apparently connected activity
N = Intermittent activity in this period
U = U-shaped burst of Type III
RS = Reverse slope burst
DP = Drifting pairs
DC = Drifting Chains
H = Herringbone
W = Weak
P = Pulsations
CONT = Continuum
UNCLF = Unclassified activity

Note: The 25-580 MHz solar radio burst observations are being continued at the Harvard Radio Astronomy Station at Fort Davis, Texas, but the preparation of data summaries will be delayed somewhat.

SELECTED SOLAR EVENTS

JULY 1978

Culgoora

UT Date 1978 JULY	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions: Central Dist. ($R_\odot$)	Positions: Position Angle (Deg.)	Polarization	Intensity (1-3)		
1	0338	0340	43.25)	1.2)			3)		
			80)	1.1)	245	-	2)	IIIG,V	*
			160)	1.0)			1)		
3	0036	0039	43.25)	1.0	290	-	3)	IIIGG,V,	SLOW DRIFT
			80)				2)		
	0507	0508	43.25)	.9	80	-	2)		
			80)				2)	IIIG,U	
			160)				1)		
4	2345	2352	43.25)	1.4)			3)		Complex source
			80)	1.2)	280	-	3)		structure.
			160)	1.0)			1)	II	
							)		
			80	1.2	290		3)		
6	0109	0110	43.25)				3)		
			80)	.7	240	-	2)	IIIGG	*
			160)				1)		
	0117	0118	43.25	1.2	140	-	2	IIIG	

Days without Heliograph observations: .....

* Other type III's observed from same position during the day.

UT Date 1978 JULY	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions: Central Dist. ($R_\odot$)	Positions: Position Angle (Deg.)	Polarization	Intensity (1-3)		
7	0153	0154	43.25)				3)		
			80)	.6	130	-	2)	IIIB,V	
			160)				2)		
7/8	2300	0500	80)	.9	90	Varying	1	I	Type I activity persisted from this region until 12th.
			160)						
	0217	0218	80)	.6	220	-	1)	IIIG	
			160)		190		3)		
	0400	0401	80)	1.1	90	-	1)	IIIB	
			160)				2)		
	2313	2314	43.25)	1.3)	300	-	3)	IIIB,V	*
			80)	1.1)			2)		
9	0442	0447	43.25)	.7)			3)		
			80)	.9)	60	-	3)	IIIGG	*
			160)	.9)			2)		
	0521	0522	43.25)	1.1	240	-	3)	IIIG,V,U	*
			80)				2)		

Days without Heliograph observations: .....

* Other type III's observed from same position during the day-

SELECTED SOLAR EVENTS

JULY 1978

Culgoora

UT Date 1978 JULY	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions		Polarization	Intensity (1-3)		
				Central Dist. ($R_\odot$)	Position Angle (Deg.)				
10	0521	0524	43.25)				3)		
			80)	1.0	90	-	3)	IIIGG,V	*
			160)				2)		
11	0122	0127	43.25)						
			80)	.7	70	-	3	IIIGG	*
			160)						
	0128	0130	43.25)						
			80)	.7	70	-	3	II	
			160)						
	0336	0340	43.25)						
			80)	.7	70	-	3	IIIGG,V	
			160)						
	0344	0354	43.25)						
			80)	.7	70	-	3	II	
			160)						
	0428	0450	43.25)				)		
			80)	.7	70	-	3)	II,IIIG	
			160)				)		

Days without Heliograph observations: .....

* Other type III's observed from same position during the day.

UT Date 1978 JULY	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions		Polarization	Intensity (1-3)		
				Central Dist. ($R_\odot$)	Position Angle (Deg.)				
12	0042	0052	43.25)						
			80)	.3	90	-	3	IIIGG,V	*
			160)						
12/13	2300	0500	43.25)						
			80)	0	0	-	2	IIIS	
			160)						
13	0019	0021	43.25)						
			80)	.1	90	-	3	IIIG,V	
			160)						
13/14	2348	2349	80)	0	0	-	1)	IIIG	
			160)				2)		
15	0054	0057	80)	0	0	-	2)	IIIGG,V	*
			160)				3)		
	0359	0410	43.25)				3)	II	Due to equipment failure the early part of the type II (0352-0359) was missed. The type II was suspected to be from a region behind the limb.
			80)	1.0	90	-	2)		
			160)				2)		

Days without Heliograph observations: .....

* Other type III's observed from same position during the day.

SELECTED SOLAR EVENTS

JULY 1978

Culgoora

UT Date 1978. JULY	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions: Central Dist. ($R_\odot$)	Positions: Position Angle (Deg.)	Polarization	Intensity (1-3)		
15	0404	0406	160	0	0	-	2	IIIGG	
16	0316	0331	43.25)	1.3	300	-	3	II	The type II was suspected to be from a region behind the limb.
			80)						
17	0014	0310	43.25)	.6	110	-	3)	CONT. II,IIIG	The type IV continuum moved from position A to B at times indicated.
			(A) 80)	.6	130		2)		
			160)				2)		
			(B) 80)	1.0	130	R	1	IV	
			160)						
	0034	0036	43.25)				2)		
			80)	.5	225	-	2)	IIIG	
			160)				1)		
	2305	2308	43.25)	.4)					
			80)	.3)	120	-	2	IIIG, uncl, slow drift.	
			160)	.3)					
18/19	2300	0500	80)	1.0	300	L	1	IS	
			160)						

Days without Heliograph observations: .....

* Other type III's observed from same position during the day.

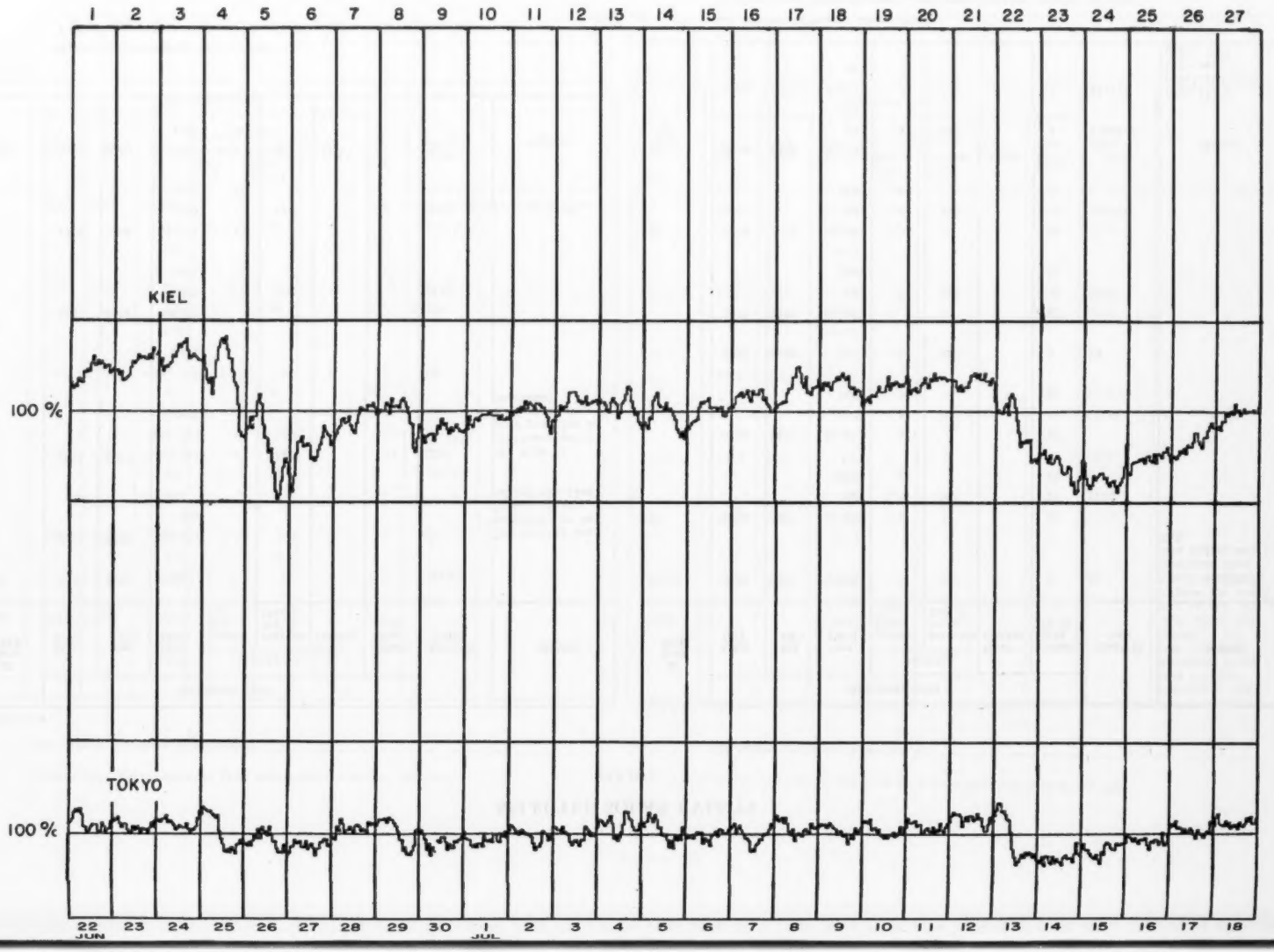
UT Date 1978. JULY	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions: Central Dist. ($R_\odot$)	Positions: Position Angle (Deg.)	Polarization	Intensity (1-3)		
18/19	2300	0500	160	.2	180	R	1	IS	Type I activity persisted from this region until 20th.
20	0056	0057	43.25)	1.1)			3)		
			80)	1.0)	300	-	2)	IIIG	
			160)	.9)			2)		
	0230	0241	43.25)	.6)			3)		
			80)	.4)	260	-	2)	IIIGG	*
			160)	.3)			2)		
22	0120	0500	160	.5	310	L	2	IS	
	0431	0433	43.25)				2)		
			80)	.5	310	-	2)	IIIG	*
			160)				1)		
23	0234	0236	43.25)	1.2)			3)		
			80)	1.0)	260	-	3)	IIIG,V	
			160)	.9)			2)		
29	0134	0136	43.25)						
			80)	.8	340	-	2	IIIGG,W	*
			160)						
	0218	0220	43.25)	.9	310	-	2	IIIG,W	Type III's persisted from this region until 30th.
			80)						

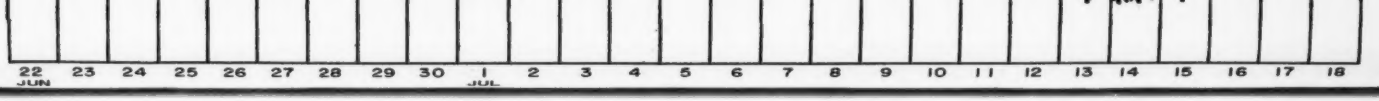
Days without Heliograph observations: .....

* Other type III's observed from same position during the day.

COSMIC RAY INDICES
(Neutron Monitors)

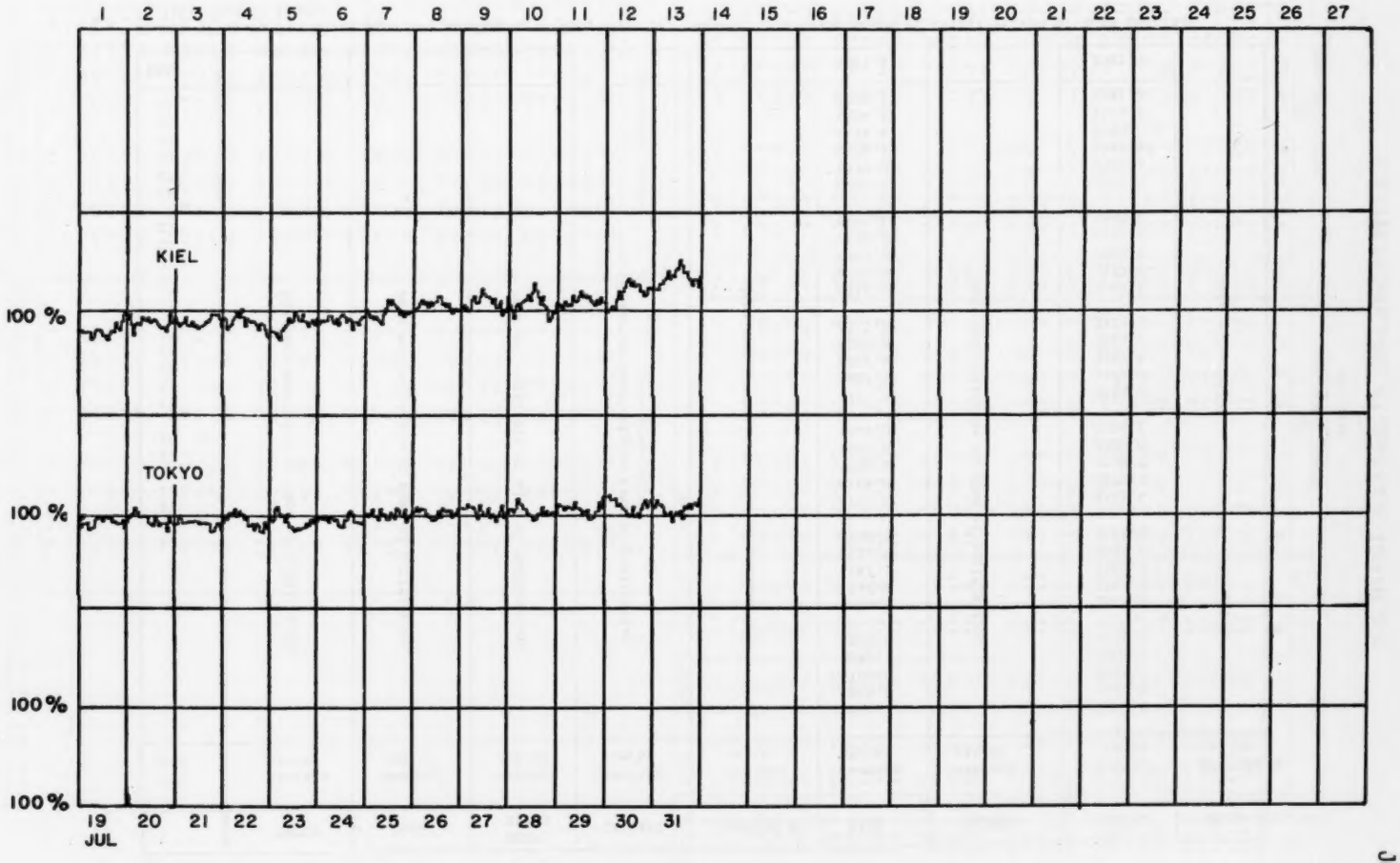
Bartels Rotation 1981 (June-July 1978)





COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1982 (July 1978)



COSMIC RAY INDICES
(Neutron Monitors)

	THULE	ALERT	DEEP RIVER	CALGARY	SULPHUR MT	KIEL	CLIMAX	TOKYO	KULA
July 1978	Average cts/hr	Average cts/hr	Average cts/hr	Average cts/hr	Average cts/hr	Average cts/hr	Average cts/hr	Average cts/hr	Average cts/hr
1						6046.7		3535.8	
2						6069.4		3544.0	
3						6100.0		3546.2	
4						6086.1		3565.1	
5						6052.8		3555.5	
6						6070.3		3545.2	
7						6112.2		3545.7	
8						6147.1		3560.3	
9						6157.9		3554.0	
10						6143.5		3554.8	
11						6165.1		3561.4	
12						6166.8		3576.2	
13						6015.4		3538.8	
14						5885.0		3500.0	
15						5849.0		3516.1	
16						5911.5		3534.2	
17						5967.4		3554.9	
18						6061.4		3567.8	
19						6088.5		3568.7	
20						6112.5		3572.1	
21						6114.2		3564.8	
22						6112.3		3570.7	
23						6107.2		3568.7	
24						6120.6		3571.6	
25						6145.4		3580.9	
26						6167.4		3584.4	
27						6175.0		3586.3	
28						6170.2		3586.9	
29						6179.6		3590.6	
30						6204.6		3596.8	
31						6252.1		3591.3	
MEAN						6095.4		3561.0	

Data not available at time of publication.

( ) Number of hours for which data are available if less than 24. Number of Section Hours at Climax if sum of both sections is less than 40 hours.

Notes: Thule, Alert, Calgary, Sulphur Mountain, Kiel, Climax and Kula Scaling Factors = 100. Deep River Scaling Factor = 300. Tokyo Scaling Factor = 256.

ERRATA: May 1978 Deep River and Alert graphical plots were reversed in SGD 407 Part I, page 156, July 1978 issue. The upper curve is actually Deep River data and the lower curve is Alert data. Drs. S. P. Agrawal and D. Venkatesan (The University of Calgary) kindly brought this unfortunate error to our attention.

GEOMAGNETIC ACTIVITY INDICES

JULY 1978

Day		Three-Hourly Indices Kp									Three-Hourly Indices Km								Ap	aa *			*		Cp
		1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8		N	S	M			
1		2-	1+	1	2+	2+	2-	0+	1-	11+	2-	1+	1+	2+	2	1+	0+	1-	6	12	12	13	11	C	0.2
2	Q8	2	1-	2	2-	1+	2	1	1	12-	2-	1-	2	2	1+	1+	1	1	5	12	10	12	10	CC	0.2
3		1	1	2+	2	2-	1	2	5	16	1	1-	2+	2	2-	1+	2	4	11	18	13	11	21		0.6
4	D1	6	4-	4	4	8-	8	4-	6	43	5+	3+	4+	4-	6-	6-	3+	5	80	95	71	64	103		1.8
5	D3	6-	7	7-	4+	4	4-	4-	3-	38-	4	6	6-	5-	4	3	3	2+	53	68	69	98	40		1.6
6		3-	2	3+	2-	3	4-	3-	2+	21+	2	2+	4-	2-	2+	3+	3-	2-	13	25	21	23	23		0.7
7		3-	2+	2	4-	3+	3+	4-	2	23	3	2	2+	3	3-	3-	3	2	14	26	23	22	27		0.8
8		3-	3-	3-	2-	3+	4+	3	2+	23-	3-	3-	2+	2-	3-	4-	3-	2	14	33	16	20	31		0.8
9		3	1	1	1	2	3+	2+	2	16-	3-	1+	1+	1+	2-	3-	2-	1+	8	17	8	10	15	C	0.5
10		2	2+	3+	2	3-	2-	2+	2+	19-	2-	2+	3	2-	2+	1+	2-	2+	10	21	18	21	18		0.5
11	Q0	2	2-	1+	3-	1+	1	1-	1-	11+	2	2-	1+	3-	1	1-	0+	1	6	11	10	14	8	CC	0.3
12	Q5	0+	0+	0+	1-	1	2+	2	2	9	0+	1-	0+	1-	1-	2-	1+	2-	4	12	8	5	15	C	0.2
13	Q4	3	3	4+	2	4	3	2-	5-	26-	3	3	4-	2+	3	2	2-	4-	20	38	23	32	29		1.0
14	Q2	6-	5	4	5+	6-	5+	5	3+	39+	5	4+	3+	5	5-	4	4	3	48	48	56	53	51		1.6
15		3+	2+	1+	1-	0+	1-	1+	1+	11+	3	3	2	1-	1-	0+	1	1	6	11	12	19	4	K	0.3
16		4-	1-	0+	1-	1+	1	1+	2-	11-	3+	1	0+	1-	1+	2-	1	1+	6	15	11	15	11	KK	0.3
17	Q9	2-	1+	1-	2+	1	1+	2-	2-	12-	2-	1	1	2+	1	1	2-	1+	6	10	7	9	9	CC	0.2
18	D5+	2	2+	1-	1+	3	4+	4	5	23-	2	3-	1+	2	3	4-	3	5-	18	33	32	17	48		1.0
19		3	3	4-	2+	2+	2-	1+	1	18+	3-	4-	4-	2	2+	2	1	1+	11	21	19	29	11		0.6
20	Q6	1+	2-	2	1+	1	1+	1+	1	11	1+	2-	2+	1+	1-	1	1	1	5	11	8	12	8	CC	0.2
21		2-	1+	2-	2-	2-	1+	2-	2-	13-	2-	1+	2-	2	1+	1+	1+	1+	6	13	9	11	11	CC	0.3
22		2+	3	2+	2-	1	1	2+	3-	16+	2	3-	2+	1+	1	1+	2	3-	8	21	12	16	17		0.5
23		2+	2+	2	1	1-	2	3-	3-	16-	2-	3-	2	1	0+	1+	3-	3-	8	21	13	14	20		0.4
24		1+	1	1+	1	1+	1	2	3-	12-	2-	1-	1	1	1+	2-	2-	2+	6	15	9	8	16	C	0.3
25		2+	2-	1	1+	2-	2-	3	3	16-	2	2	1	1+	2-	2-	3	3	8	19	15	14	21		0.4
26	Q7	2-	2-	1-	1-	2-	1+	2	2	12-	2-	2-	1+	1-	1+	1+	2-	2-	5	14	10	12	12	CK	0.2
27	Q4	1	0+	0+	2-	2-	1-	1	2	9-	1	0	0+	2-	1+	0+	1	2	4	9	8	9	9	CC	0.1
28		2-	2+	3-	2+	2-	1-	0+	0+	12	2-	2+	3-	2+	1+	0+	0	0	6	10	10	14	6	CC	0.3
29	Q3	0	0+	1	1+	1	1	1	2	8-	0+	0+	1	1+	1+	1	1	2-	4	9	9	5	12	CC	0.1
30	Q2	2-	1-	0+	1	1	1	0+	0+	6+	2-	1-	0+	0+	1-	1-	0+	0	3	8	4	7	5	CC	0.1
31	Q1	0	0	0+	0+	0+	1-	1-	0+	3-	0	0	0	0	0+	0+	0+	0	2	3	3	2	4	CC	0.0
																		Mean	13	21.9	17.7	19.9			0.52

Day	Three-Hourly Indices Kn								Three-Hourly Indices Ks							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
1	2	1+	1+	2+	2+	2-	0+	1	1	1	1+	2	1+	1+	0	0+
2	2-	1-	2+	2+	2-	2	1+	1-	1+	1-	2-	1+	1-	1-	1-	1+
3	1-	1-	3-	2+	2	1+	2	4+	1	1	2-	1+	1+	1	2	4
4	6-	3+	4	4	6	6-	3+	5-	5	3+	4+	3+	5	6	3+	5+
5	4	6	6	5-	4	3	3	3-	4	6-	6-	5-	4-	3-	3	2
6	2+	2+	4	2	3-	3+	3-	2	2	2	3+	1+	1+	3+	3-	1+
7	3-	2	3-	3+	3-	3-	3	2	3	2+	2+	3-	3-	3-	3+	2
8	2+	2+	2+	2+	3	4	3-	2+	3-	3-	2	1+	2	4-	2+	2
9	3-	1+	1+	1+	2	3	2+	2-	3-	1+	1+	1+	1	2+	1+	1
10	2-	3-	3+	2	3-	2	2	2+	1+	2	3-	2-	2	1-	1	2
11	2	2-	2-	3	1+	1	1-	1+	2	1+	1-	2+	1-	0+	0	0+
12	1-	1	0+	1-	1-	2+	2	2	0	0+	0+	1-	1-	1	1-	1+
13	3+	3	4	2+	4-	3-	2	4	3-	3	4-	2	2	1+	1+	3
14	5	5-	4-	5	5-	4	4	3+	5	4+	3	5-	4+	4	4+	3-
15	3+	3	2+	1+	1	0+	1+	1+	3-	3	2-	0	0	0	0+	0+
16	3-	1-	0+	1+	2-	2-	1+	2-	4-	1	0+	0+	0+	2-	1-	1
17	2-	1+	1	3-	1+	1+	2	2	2-	1-	1	2-	1-	0+	1+	1-
18	2	3-	1+	2+	3	4-	3	5-	2	3-	1+	2	3-	3+	3	4+
19	3-	3+	4	2+	3-	2	1	1+	3	4-	4-	2-	1+	2-	1	1+
20	1+	2	2+	1+	1+	1+	1+	1	1	1+	2+	1	0+	0+	1-	1+
21	2-	1+	2+	2+	2	2-	2-	2-	2-	2-	1+	1+	1	0+	1-	1-
22	2	3-	2+	2-	1+	1+	2	2+	2	3-	2+	1	1-	1	2	3-
23	2	3-	2+	1+	1-	2	3-	3-	1+	3-	2-	1-	0+	1-	3-	3
24	1+	1-	1+	1+	2-	1+	2	2+	2	1-	1	1-	1-	2-	2-	2+
25	2	2	1	1+	2	2	3-	3-	2	2	1	1+	1+	1	3+	3
26	2-	2-	1+	1	2	2-	2	2+	2-	1+	1+	1-	1-	1-	1+	1+
27	1	0	0+	2-	2	0+	1	2	1	0	0+	1+	1-	0	1-	2
28	2-	2+	3	3-	2	0+	0+	0	1+	2+	2+	2-	1	0+	0	0
29	0+	1-	1+	1+	1+	1+	2-	2-	0+	0+	1-	1	1	1	0+	2-
30	2-	1-	0+	1	1	1	1-	0	1+	0+	0+	0	0	0+	0+	0
31	0+	0	0	0+	1-	1-	1-	0	0	0	0	0	0	0	0+	0

Quiet days (Q) and disturbed days (D), geomagnetic planetary three-hour-range indices (Kp) (integers alone are equivalent to those normally given with a small zero), magnetic character figures (Cp), and average amplitude (Ap) (unit 2γ) prepared by Geophysikalisches Institut at the University of Göttingen, F.R. of Germany for the International Service of Geomagnetic Indices. Ten most quiet days [Q1-Q0(10)] and five most disturbed days [D1-D5] are ordered from most quiet or disturbed, respectively. A or K means "not really quiet" (A = "Ap>6", K = "Ap ≤6 but one Kp ≥3o or two Kp values ≥3-"). An * means "not really disturbed" (Ap<20).

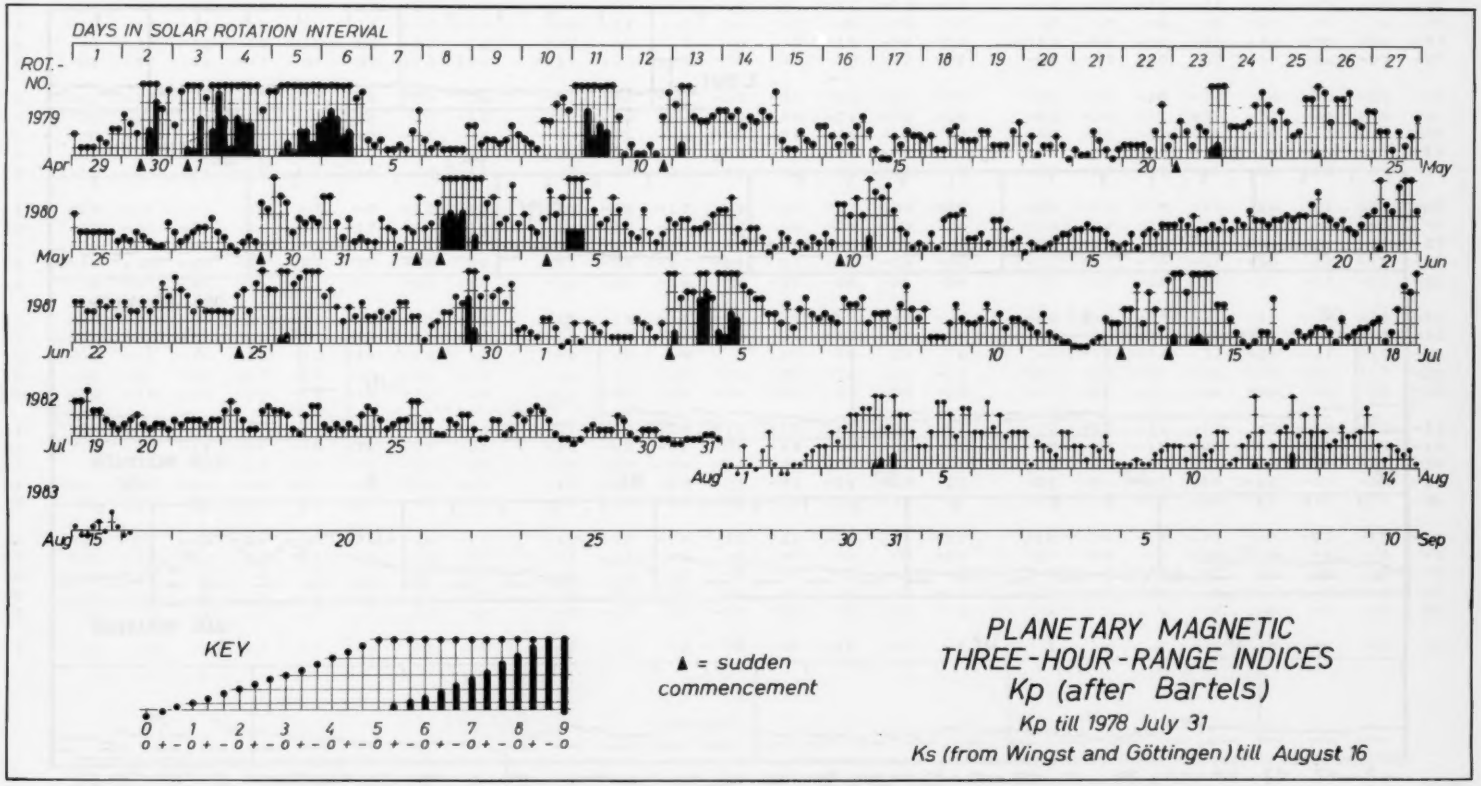
Geomagnetic three-hourly indices (Kn), (Ks) and (Km) as in IAGA-Bulletin No. 32 and indices (aa), "antipodal", as in IAGA-Bulletin No. 33 prepared by P. N. Mayaud of the Institut de Physique du Globe, Paris, France. Really quiet (C) and quiet but slightly disturbed three-hourly intervals (K) are given for 24-hour and 48-hour intervals centered on 12 UT.

D. Venkatesan (The University of Calgary) kindly brought this unfortunate error to our attention.

DAILY AVERAGE INDICES Ap

	1977					1978						
DAY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL
1	6	4	4	5	6	7	15	33	12	88	9	6
2	4	6	5	6	69	8	14	27	15	94	82	5
3	7	8	10	4	9	13	14	15	41	83	31	11
4	9	6	7	8	14	89	11	3	55	96	26	80
5	40	3	8	10	18	31	17	6	21	7	38	53
6	21	4	8	7	5	34	14	7	9	5	8	13
7	17	6	3	5	3	13	7	9	5	7	11	14
8	12	8	6	3	2	19	10	20	5	16	10	14
9	20	11	2	3	3	23	16	14	6	85	4	8
10	12	13	4	9	4	21	7	12	36	10	24	10
11	28	19	12	6	38	7	5	7	64	30	17	6
12	11	6	28	18	21	4	10	3	29	18	10	4
13	11	28	14	26	16	8	8	12	24	11	7	20
14	12	10	13	42	8	3	11	10	51	9	4	48
15	11	9	19	25	5	2	48	17	19	5	6	6
16	9	7	8	14	9	14	11	24	8	7	6	6
17	29	10	12	8	12	9	10	25	7	8	9	6
18	13	6	22	6	3	12	10	24	19	5	11	18
19	24	42	28	6	3	6	12	15	38	4	17	11
20	8	44	7	4	4	3	12	9	23	8	11	5
21	5	64	5	5	6	1	12	7	9	26	33	6
22	5	63	22	3	6	3	22	13	8	24	15	8
23	6	21	6	2	4	2	6	15	22	24	18	8
24	10	12	6	2	5	6	5	6	48	26	19	6
25	27	10	4	15	5	12	12	3	17	10	24	8
26	13	18	6	19	11	12	37	49	18	7	46	5
27	14	24	62	12	6	5	42	70	16	5	15	4
28	7	9	47	5	10	9	46	17	12	7	12	6
29	6	3	9	6	8	36		14	6	8	32	4
30	5	4	9	12	5	36		16	58	18	31	3
31	4		6		6	23		8		12		2
MEAN	13	16	13	10	10	15	16	16	23	25	20	13

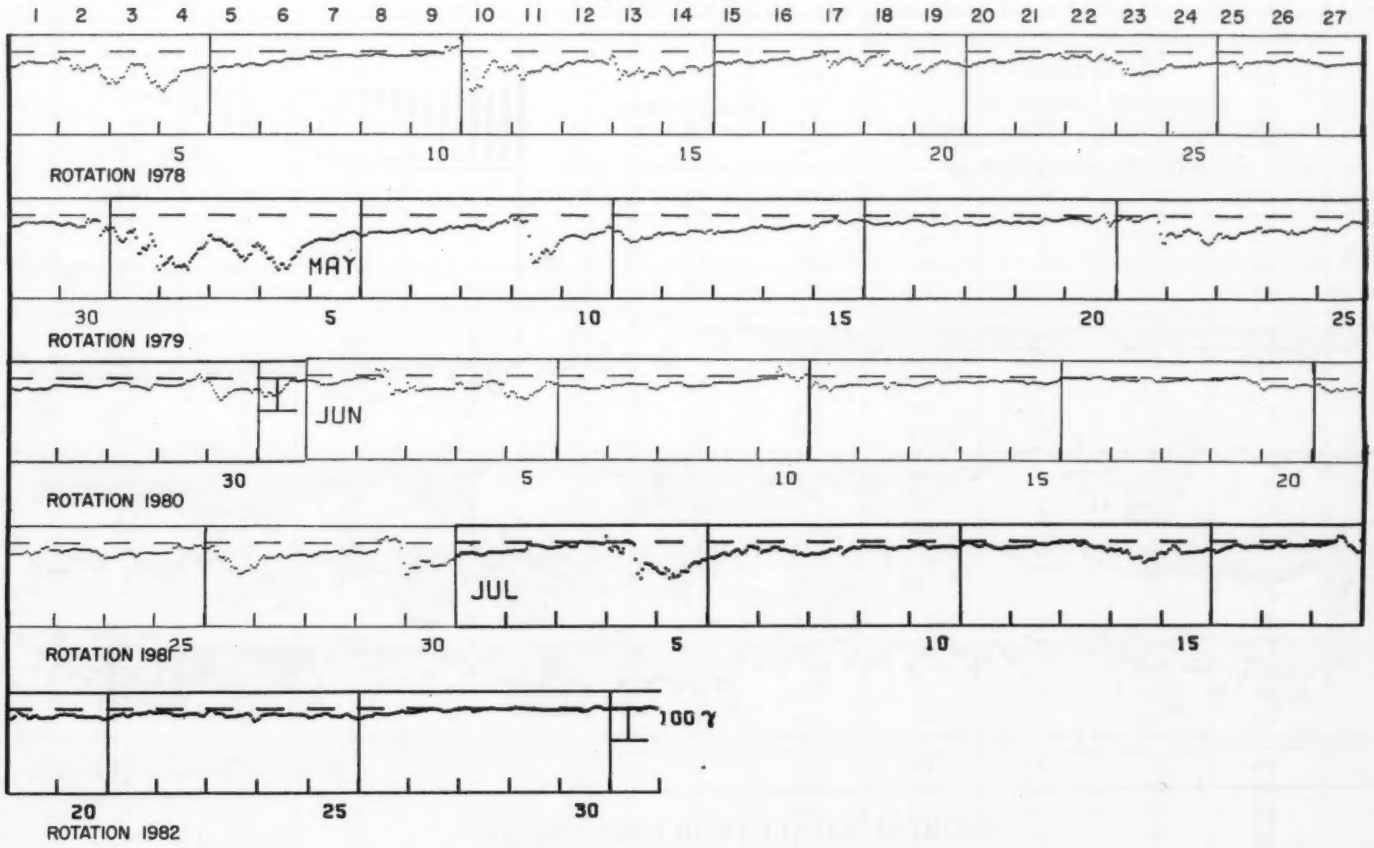
GEOMAGNETIC ACTIVITY INDICES



GEOMAGNETIC ACTIVITY INDICES

Hourly Equatorial Dst

by Bartels Rotation



Note: Both the sensitivity indicator placed on the last day of the month and the zero reference level change from month to month.

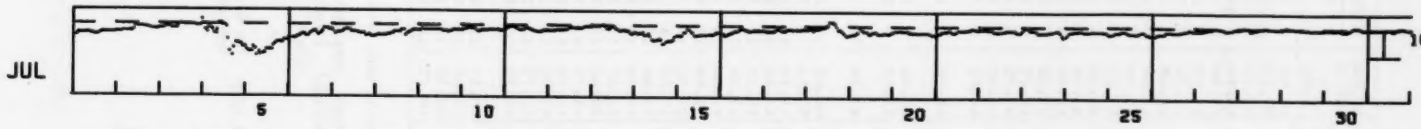
HOURLY EQUATORIAL Dst VALUES (PROVISIONAL)

NASA/GODDARD SPACE FLIGHT CENTER

JULY 1978

(Time-UT) (Units-Gammas)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	-45	-41	-35	-35	-35	-35	-35	-33	-35	-38	-38	-43	-42	-40	-36	-32	-31	-33	-33	-32	-32	-32	-32	-30
2	-29	-29	-29	-27	-26	-27	-26	-26	-30	-21	-10	-12	-13	-12	-13	-15	-16	-17	-19	-22	-22	-23	-20	-16
3	-19	-18	-14	-11	-10	-12	-17	-18	-18	-17	-7	-1	-2	-6	-6	-7	-6	-7	-6	-8	-10	-9	-9	15
4	-4	-24	-32	-14	-17	-24	-37	-38	-23	2	2	-6	-9	-13	-58	-100	-114	-85	-66	-68	-72	-76	-84	-83
5	-92	-98	-100	-98	-81	-90	-113	-100	-111	-105	-102	-90	-92	-92	-92	-76	-68	-63	-65	-67	-63	-56	-55	-57
6	-50	-48	-50	-50	-45	-42	-38	-35	-37	-43	-41	-33	-30	-25	-24	-36	-39	-33	-25	-14	-14	-16	-21	-17
7	-26	-35	-30	-29	-28	-26	-20	-17	-17	-20	-27	-30	-28	-31	-34	-36	-33	-35	-41	-38	-37	-44	-46	-41
8	-39	-37	-41	-39	-38	-40	-35	-36	-32	-31	-25	-26	-30	-26	-19	-22	-40	-33	-27	-24	-20	-18	-23	-24
9	-21	-14	-20	-20	-20	-21	-19	-17	-20	-20	-18	-17	-22	-26	-24	-23	-29	-24	-21	-18	-19	-19	-21	-19
10	-18	-13	-15	-11	-11	-14	-9	-16	-24	-27	-21	-19	-22	-21	-18	-17	-20	-21	-20	-19	-21	-23	-24	-19
11	-15	-11	-6	-5	-7	-9	-13	-18	-21	-19	-17	-9	-14	-17	-20	-23	-25	-27	-28	-28	-26	-21	-21	-22
12	-24	-24	-24	-20	-18	-17	-18	-18	-19	-19	-15	-12	-9	-11	-13	-14	-13	-12	-13	-8	-6	-6	-6	-7
13	-2	-5	-6	-4	-3	-1	1	-7	-17	-18	-10	-6	-9	-16	-19	-24	-22	-19	-20	-24	-26	-31	-36	-27
14	-30	-33	-29	-29	-27	-39	-36	-30	-42	-54	-57	-56	-53	-50	-55	-69	-68	-60	-56	-57	-56	-52	-43	-37
15	-38	-41	-37	-28	-25	-15	-15	-23	-30	-39	-38	-36	-35	-36	-34	-34	-34	-33	-35	-34	-31	-27	-25	-26
16	-32	-32	-39	-35	-31	-28	-25	-21	-20	-19	-14	-12	-15	-17	-19	-23	-24	-19	-17	-17	-19	-19	-18	-16
17	-20	-24	-23	-22	-23	-20	-15	-12	-13	-18	-22	-20	-14	-13	-14	-16	-17	-16	-14	-16	-16	-13	-13	-14
18	-15	-12	-14	-20	-12	-14	-12	-9	-6	-5	-4	2	13	10	10	5	-7	-16	-17	-23	-29	-37	-39	-35
19	-33	-31	-31	-27	-23	-7	-16	-20	-23	-24	-31	-31	-24	-22	-21	-29	-32	-29	-28	-26	-27	-32	-27	-23
20	-20	-16	-18	-15	-17	-17	-17	-18	-21	-26	-24	-24	-25	-28	-28	-25	-27	-26	-25	-24	-29	-34	-35	-33
21	-30	-26	-24	-19	-19	-19	-16	-13	-21	-26	-24	-19	-15	-15	-14	-17	-14	-13	-13	-10	-9	-13	-15	-13
22	-12	-13	-12	-11	-15	-16	-15	-21	-24	-23	-22	-20	-18	-17	-16	-15	-18	-17	-17	-20	-25	-26	-23	-15
23	-9	-4	-6	-13	-18	-16	-15	-21	-27	-27	-24	-24	-25	-24	-21	-20	-20	-17	-15	-16	-23	-35	-41	-36
24	-31	-23	-19	-19	-17	-17	-16	-15	-15	-21	-19	-21	-22	-21	-17	-20	-21	-21	-21	-19	-20	-23	-24	-28
25	-32	-31	-27	-22	-21	-22	-19	-15	-17	-20	-25	-28	-27	-28	-30	-27	-24	-19	-18	-24	-31	-30	-35	-36
26	-36	-33	-28	-26	-25	-26	-24	-17	-17	-19	-20	-22	-22	-22	-21	-17	-16	-14	-13	-13	-9	-12	-15	-15
27	-16	-13	-13	-12	-11	-10	-7	-7	-7	-2	-6	-6	-7	-6	-9	-11	-14	-11	-10	-10	-8	-4	-6	-5
28	-5	-3	1	0	-1	-4	-14	-11	-8	-9	-5	-2	-4	-3	-1	-1	-4	-6	-7	-7	-6	-5	-5	-6
29	-5	-1	2	0	-4	-4	-5	-7	-5	-5	-8	-9	-9	-9	-9	-11	-10	-9	-9	-9	-9	-9	-7	-7
30	-6	-7	-7	-9	-7	-7	-8	-8	-9	-13	-12	-12	-11	-8	-3	1	2	3	2	-2	-6	-8	-8	-6
31	-4	-5	-8	-7	-7	-8	-7	-5	-3	-3	-2	-5	-8	-11	-7	-1	1	1	2	-1	-4	-6	-5	-5



NOTE: Hourly values of the provisional equatorial Dst index for July 1978 are based on data from Hermanus, Kakioka, and San Juan. The magnetometer at Honolulu was not operating during May, June and July 1978.

PRINCIPAL MAGNETIC STORMS

JULY 1978

OBS. 3 letter IAGA code	GEOMAG-NETIC LATI-TUDE	COMMENCEMENT DAY	hr min (UT)	TYPE	SC - AMPLITUDES D(')	H(γ)	Z(γ)	MAXIMUM 3 HOUR - INDEX K DAY(3 HOUR PERIOD)	K	RANGES D(')	H(γ)	Z(γ)	UT END DAY	HOUR
COL	64.6N	3	2304	SC*	+30	+70	+29	04(6)	8	457	2340	1600	05	20
NEW	55.1N	3	2305	SC*	5	66	3	05(3)	8	78	580	510	06	10
WIT	54.2N	3	2305	SC*	- 4 *	+85 *	+ 3	04(5)	8	40	415	230	05	13
FRD	49.6N	3	2305	SC*	- 2	+80	- 9	04(5,6)	7	35	325	155	07	03
SJG	29.9N	3	2305	SC	- .5	+44	+10	04(1)	6	12	153	66	05	12
GUL	24.5N	3	2305	SC	- .7	38	- 2	--	-	12	211	63	06	02
JAI	17.3N	3	2305	SC	- .7	34	- 6	--	-	10	196	50	06	02
SHL	14.6N	3	2305	SC	..	29	6	--	-	8	202	36	06	02
UJJ	13.5N	3	2305	SC	- .2	42	- 9	--	-	8	221	50	06	02
ABG	09.5N	3	2305	SC	- .3	33	- 4	04(5)	6	9	215	65	06	02
HYB	07.6N	3	2306	SC	- .2	+33	- 2	04(6)	7	7	225	36	06	01
GUA	04.0N	3	2306	SC*	1	35	-12	04(5)	6	10	250	40	05	19
ANN	01.4N	3	2305	SC	- .8	34	18	--	-	7	256	65	06	02
HUA	00.6S	3	2305	SC	1	48	10	04(6)	7	15	471	63	05	20
TRD	01.2S	3	2305	SC	.3	25	39	--	-	5	281	121	06	02
PMG	18.7S	3	2305	SC	+ .4	+29	+24	04(5) 05(4)	6	8	240	80	05	21
HER	33.7S	3	2308	SC	+ 2	+23	+23	04(6) 05(2)	6	46	186	160	06	16
GNA	43.3S	3	2305	SC*	+ 4.8*	+14	+19 *	04(6,8) 05(4)	6	23	180	160	05	20
TOO	46.7S	3	2306	SC	-19	+13	--	04(3)	4	38	55	16		
TOO	46.7S	4	0847	SC	- 4	+20	--	05(6)	6	171	92	60	05	20
HYB	07.6N	6	0617	SC	- .5	+31	- 5	06(3,6) 07(3,4)	4	6	85	22	07	20
HUA	00.6S	6	0110	..	..	..	..	06(6)	5	6	186	43	07	21
IRK	41.0N	30	2306	SC*	- 2.1	24	5	04(4,5,6)	6	26	226	86	05	21
COL	64.6N	13	2328	SC*	+ 6	+124	..	14(4,5,6)	6	143	1490	760	15	06
NEW	55.1N	13	2328	SC	6	84	6	14(2,4,5)	6	63	239	348	15	08
WIT	54.2N	13	2328	SC	-10	+62		14(1,5,6,7)	5	20	175	115	15	01
FRD	49.6N	13	0015	SC*	- 1	+28	- 6	14(1,4)	6	32	152	71	16	03
GUL	24.5N	13	2328	SC	- .2	22	- 1	--	-	8	118	42	15	01
JAI	17.3N	13	2328	SC	- .2	19	- 2	--	-	9	163	42	15	01
SHL	14.6N	13	2326	SC	2.1	18	4	--	-	7	139	27	15	01
UJJ	13.5N	13	2328	SC	- .1	25	- 3	--	-	6	131	31	15	01
ABG	09.5N	13	2328	SC	- .1	20	6	14(4)	5	6	129	32	15	01
HYB	07.6N	13	2328	SC	+ .9	+24	- 1	14(5)	6	5	179	22	15	10
HYB	07.6N	13	0016	SC	- .1	+12	- 1	13(2,3)	4	5	112	14	13	18
GUA	04.0N	13	2337	SC	1	35	-10	13(3)	5	10	120	36	15	10
ANN	01.4N	13	2328	SC	- .1	19	8	--	-	5	174	77	15	01
HUA	00.6S	13	0015	SC	1	17	3	14(5,6,7)	5	9	208	54	15	06
TRD	01.2S	13	2328	SC	.7	14	25	--	-	3	201	67	15	01
PMG	18.7S	13	2327	SC	+ .3	+24	+21	14(2,3,4)	5	6	110	70	15	09
GNA	43.3S	13	2328	SC	+ 1.0	+ 8	+ 4	14(2,4,5,6,7)	5	13	100	90	15	07
TOO	46.7S	13	2330	SC	-15	+11	--	14(4)	5	99	116	36	15	08
TOO	46.7S	13	0012	SC	-11	+ 5	--	13(3)	4	19	51	19	13	15
NEW	55.1N	18	0418	SC*	1	22	--	18(8)	5	25	101	71	20	12
HYB	07.6N	18	0100	..				19(2,3)	5	7	112	37	19	19
GNA	43.3S	18	0417	SC*	- 1.3	- 9 *	- 6	18(8)	5	13	50	70	19	09
TOO	46.7S	18	0418	SC	+ 5	- 3	--	18(6)	4	12	46	11	19	18

Reports were received from the following observatories:

Alibag Annamalainagar College Fredericksburg Gnangara Guam Gulmarg Hermanus Huancayo
Hyderabad Irkutsk Jaipur Newport Port Moresby San Juan Shillong Toolangi Trivandrum
Ujjain Witteveen

Please note: The Boulder Geomagnetic Observatory converted to digital format in March 1978. Since that time, data which were reduced from the anolog recordings are no longer available, e.g., Principal magnetic storms and K indices.

SUDDEN COMMENCEMENTS AND SOLAR FLARE EFFECTS

JULY 1978

PRELIMINARY REPORT ON RAPID MAGNETIC VARIATIONS (by Dr. A. Romaná).

The meaning of the station symbols is given in the IAGA-News No. 16.
Times of ssc are mean values.

Sudden commencements followed by a magnetic storm or a period of storminess (ssc).

03	2305	A:	SOD WNG WIT ESK DOU VIC FUR OTT AQU EBR COI TOL FRD HUA LMM LAS TRW PAF DRV
		B:	NGK HAD MMB KAK KNY CZT
13	0015	A:	VIC OTT FRD HUA
		B:	ESK WNG WIT HAD FUR AQU EBR TOL FRD LMM LAS TRW PAF DRV
		C:	NGK MMB CZT
13	2328	A:	VIC FUR AQU EBR COI TOL HUA LMM LAS TRW
		B:	WNG WIT HAD MMB KAK KNY
		C:	NGK CZT PAF DRV
18	0418	B:	FUR HUA DRV
		C:	VIC MMB CZT PAF

Solar-flare effects (sfe)

Effects confirmed by ionospheric or solar observations are underlined.

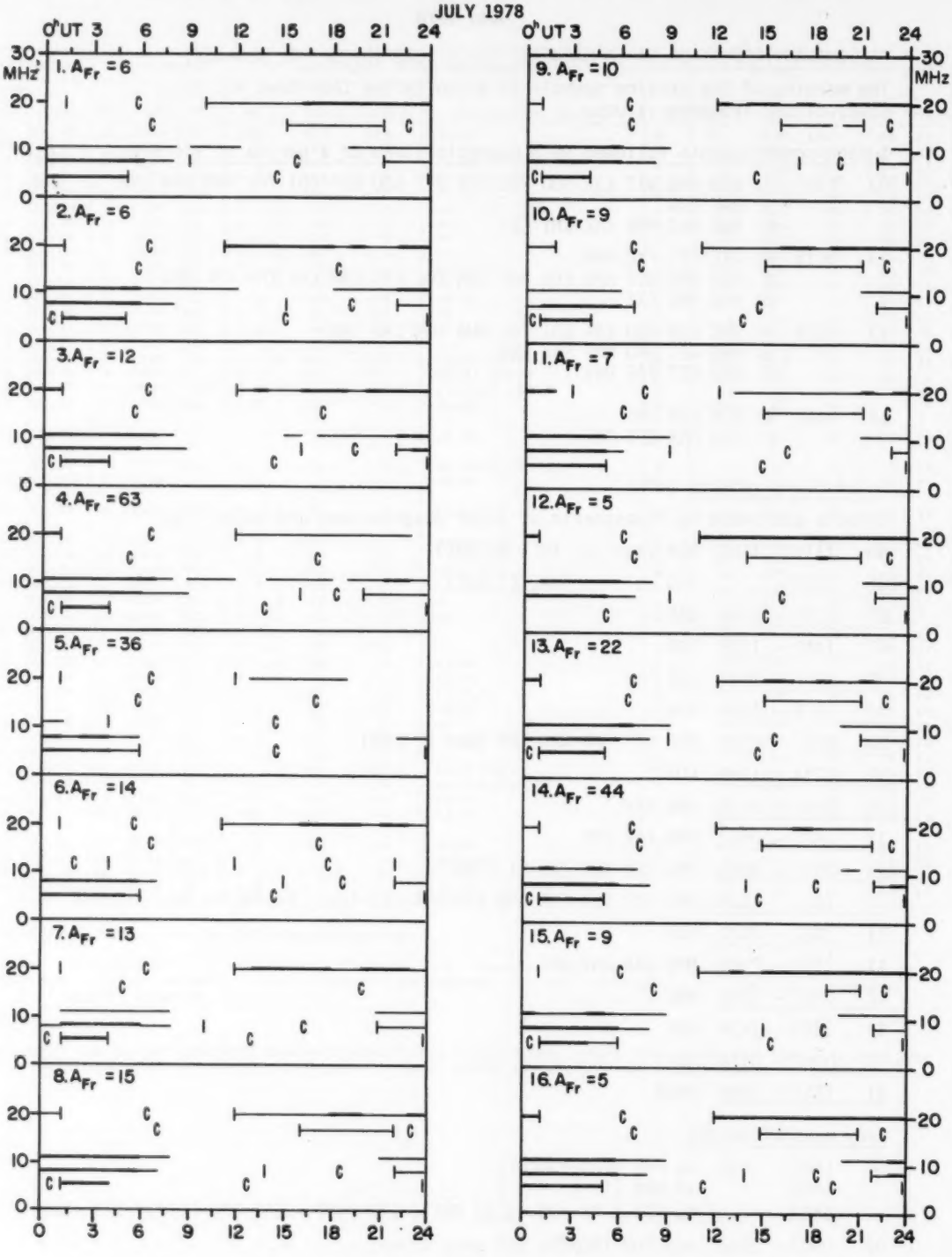
06	1113 - 1131	NGK (ssc: B: TOL; C: PAF)
06	1512 -	WNG (si: A: HUA; C: NGK)
07	0534 - 0606	KAK
07	1440 - 1455	HUA
08	1946 - 2010	HUA
09	1819 - 1845	HUA
10	0607 - 0640	WNG WIT MMB KAK KNY (bp: B: LMM)
10	1724 - 1748	HUA
11	0359 - 0415	MMB KAK
11	0426 - 0511	MMB KAK KNY
11	0542 - 0609	MMB KAK KNY (b: A: LMM)
11	1051 - 1130	WNG WIT NGK FUR AQU EBR HUA LAS (ssc: B: TOL? - bs: A: LMM)
11	2021 - 2030	HUA
11	2227 - 2300	MMB KAK KNY HUA
12	0242 - 0340	MMB
13	1349 - 1434	NGK
15	0052 - 0118	KNY
21	1854 - 1906	HHUA

Very unusual events

04	1440 - 1630	pg FUR (∿700s∿20nT)
	1443	si HUA (+ + +)
	1452	bp CZT (-64 +98 -110) PAF (+557 +450 -220) DRV (+273 +173 -380)
09	0500 - 1400	pc3 FUR (20/25s 5nT very clear)
	0657 - 1305	pc3 TOL

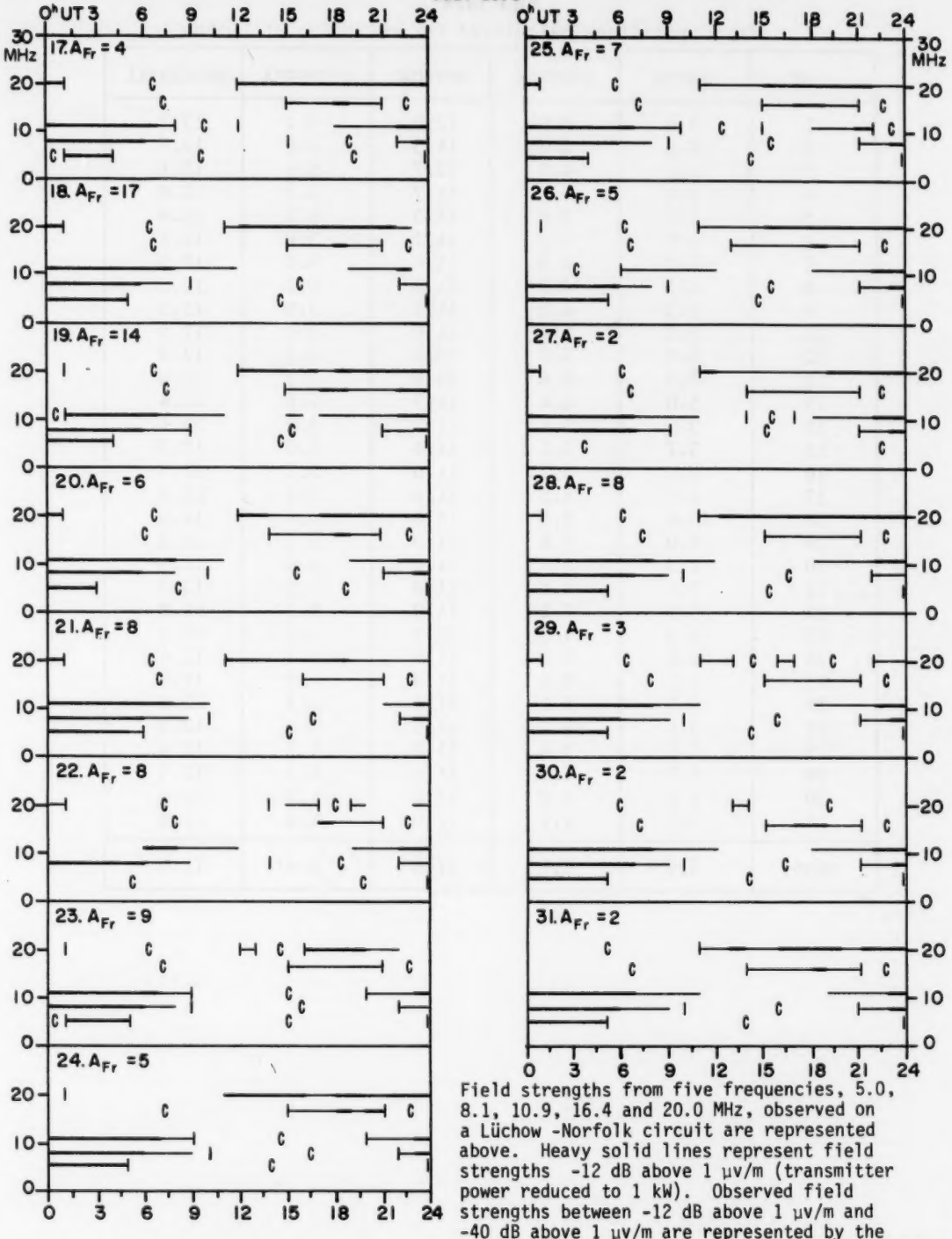
TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

JULY 1978



TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

JULY 1978



Field strengths from five frequencies, 5.0, 8.1, 10.9, 16.4 and 20.0 MHz, observed on a Lüchow -Norfolk circuit are represented above. Heavy solid lines represent field strengths -12 dB above 1 μv/m (transmitter power reduced to 1 kW). Observed field strengths between -12 dB above 1 μv/m and -40 dB above 1 μv/m are represented by the fine line. Adapted from Observations by Deutsche Bundespost

RADIO PROPAGATION QUALITY INDICES

JULY 1978

Quality indices calculated for reception at Lüchow

DAY	TOKYO	NORFOLK	MOSCOW	CANBERRA	BRACKNELL
1	8.3	4.6	12.5	4.4	13.1
2	6.9	5.2	11.5	5.0	12.7
3	7.1	4.7	12.7	5.1	13.1
4	2.8	4.0	11.7	3.3	12.0
5	2.1	3.9	11.3	4.3	11.4
6	4.9	4.3	11.7	3.9	12.4
7	5.1	4.8	11.4	4.0	12.0
8	4.4	4.0	11.6	4.2	12.5
9	5.3	4.3	11.1	3.9	11.5
10	5.7	4.2	11.0	3.9	11.5
11	6.6	3.7	10.3	4.3	12.5
12	7.3	5.4	12.6	4.3	12.8
13	5.0	4.4	11.3	4.8	12.4
14	3.2	3.6	11.2	5.5	12.1
15	5.7	5.1	11.4	5.0	12.7
16	7.2	5.7	11.6	5.2	12.3
17	6.7	5.5	11.6	4.5	12.6
18	5.6	5.6	12.0	4.6	12.6
19	6.0	5.4	11.3	5.3	12.2
20	7.3	5.1	11.4	4.6	12.9
21	7.6	4.8	11.8	4.8	12.8
22	5.8	4.1	11.0	5.1	12.5
23	5.3	4.5	12.1	4.6	12.5
24	5.4	5.3	11.5	4.3	12.4
25	5.3	5.1	11.8	4.5	12.7
26	6.0	5.1	11.4	5.2	12.9
27	5.6	4.7	11.5	5.0	12.5
28	7.5	5.4	11.3	4.9	12.4
29	7.3	5.1	11.6	4.5	12.5
30	7.2	4.4	11.9	4.2	12.4
31	7.2	4.9	12.0	4.2	12.9
MEAN	5.9	4.7	11.6	4.6	12.4

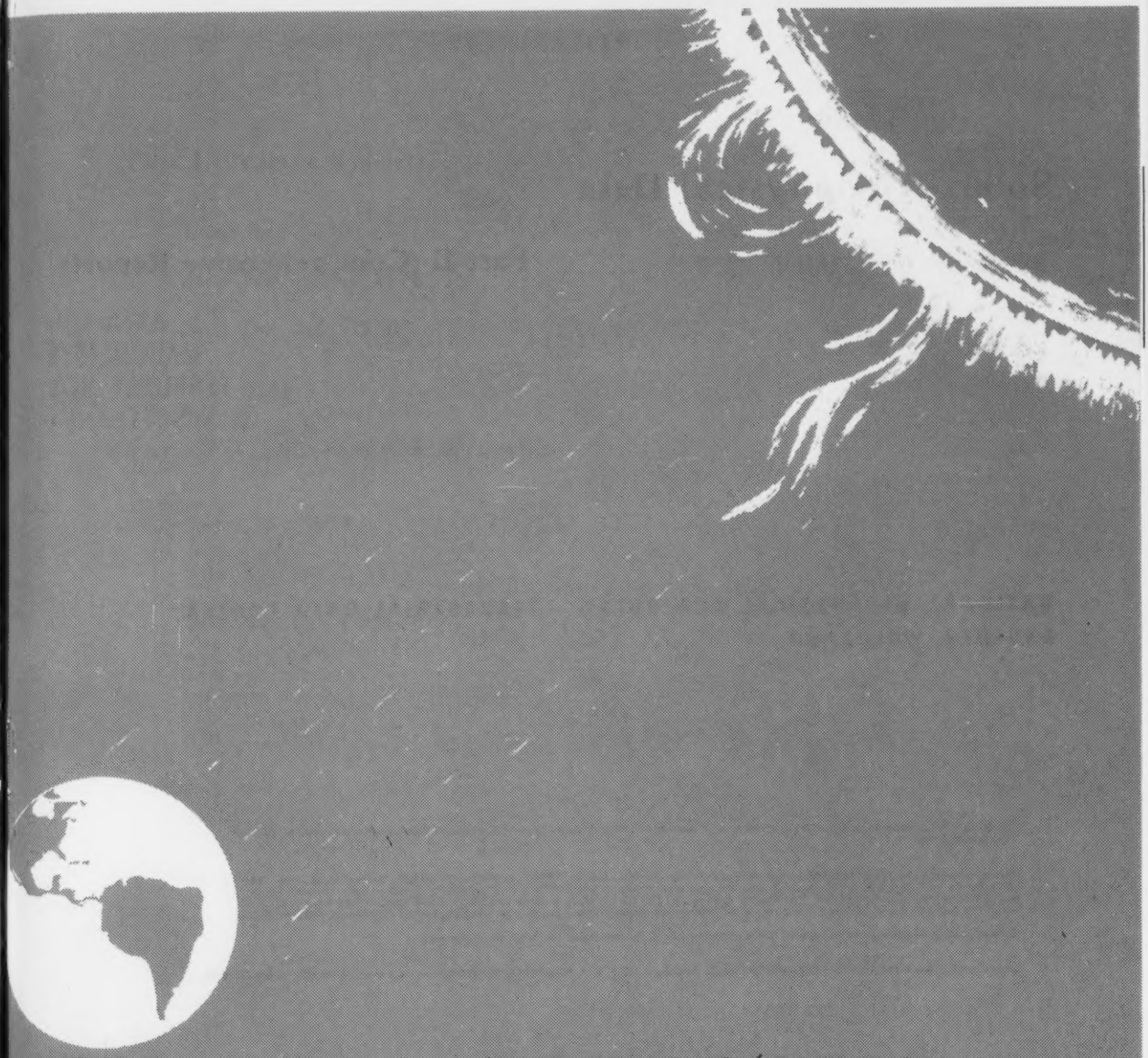
USCOMM-NOAA-ASHEVILLE, N.C. 10/78/950

OCT 25 1978

SEPTEMBER 1978 Number 409

Solar-Geophysical Data comprehensive reports

Data for March 1978 -- February 1978 & Miscellanea
Explanation of Data Reports Issued as Number 402 (Supplement) February 1978



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Solar - Geophysical Data

NO. 409 SEPTEMBER 1978

Part II (Comprehensive Reports)

DATA FOR
MARCH 1978
FEBRUARY 1978
& MISCELLANEA

NATIONAL GEOPHYSICAL AND SOLAR - TERRESTRIAL DATA CENTER
BOULDER, COLORADO

For obtaining bulletins on a data exchange basis, send request to: World Data Center A for Solar-Terrestrial Physics, NOAA, Boulder, Colorado 80303.

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To standardize referencing these reports in the open literature, the following format is recommended:

Solar-Geophysical Data, 390 Part I (or Part II), pages, February 1977, U.S. Department of Commerce, (Boulder, Colorado, U.S.A. 80303).

SOLAR-GEOPHYSICAL DATA

No. 409

Issued in two parts

Helen E. Coffey, Editor

J. Virginia Lincoln, Chief
Solar-Terrestrial Physics Division

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A.8g	Daily Values of Adjusted Solar Flux (AFGL)	397A 7	398A 7	399A 7	400A 7	401A 7	402A 9	403A 9	404A 9	405A 9	406A 9	407A 9	408A 9	409A 9
A.9cb	8.6 mm Radio Maps of the Sun (NOSC - La Posta)	398A 36	400B 57	400A 30	401A 36	402A 38	403A 47	404A 40	405A 48	406A 54	407A 46	408A 50	409A 38	
A.9d	2 cm Radio Maps of the Sun (NOSC - La Posta)	398A 36	400B 52	400A 30	401A 36	402A 38	403A 47	404A 40	405A 48	406A 54	407A 46	408A 50	409A 38	
A.10a	169 MHz - Interferometric Observations (Nancay)	397A 13	398A 14	399A 14	400A 12	401A 15	402A 16	403A 20	404A 17	405A 17	406A 19	407A 20	408A 19	409A 17
A.10c	21 cm East-West Solar Scans (Fleurs)	397A 15	398A 16	399A 16	400A 14	401A 17	402A 19	403A 23	404A 20	405A 20	406A 22	407A 23	408A 22	409A 20
A.10d	43 cm East-West Solar Scans (Fleurs)	397A 16	398A 17	399A 17	400A 15	401A 18	402A 20	403A 24	404A 21	405A 21	406A 23	407A 24	408A 23	409A 21
A.10e	10.7 cm East-West Solar Scans (Ottawa-ARO)	397A 14	398A 15	399A 15	400A 13	401A 16	402A 18	403A 22	404A 19	405A 19	406A 21	407A 22	408A 21	409A 19
A.10f	3 cm East-West Solar Scans (Toyokawa)					403B 68	402A 17	403A 21	404A 18	405A 18	406A 20	407A 21	408A 20	409A 18
A.11k	Solar X-ray Radiation (SOLRAD 11)						403A116	404A108	405A122	406A129	407A123	408A123		
A.11g	Solar X-ray (SMS/GOES)	----	398A 25	399A 20	400A 17	401A 22	402A 24	403A 29	404A 24	405A 29	406A 30	407A 29	408A 31	409A 25
A.11h	Solar X-ray (OSO-8; 1975-057A)	398A 36	399A 34	400A 30	401A 36	402A 38	403A 46	404A 40	405A 48	406A 54	407A 46	408A 50	409A 38	
A.11i	Solar X-ray (Columbia U.)	404B 65	404B 68	404B 40										
A.12ba	Cosmic Ray Protons (Pioneers 6 & 7)	397A 23	----	399A 26	----	----	402A 30	----	----	----	----	----	----	----
A.12bb	Cosmic Ray Protons (Pioneers 8 & 9)	----	----	399A 27	----	----	402A 31	----	----	----	----	----	408A 43	----
A.12e	Energetic Solar Particles (IMP H & J)	402B 24	403B 37	404B 35	405B 22	406B 43	407B 33	408B 62						
A.12f	Energetic Solar Particles (GHS/SEM)	----	406B 78	----	----	----	----	----	----	----	406A 44	----	408A 45	----
A.13a	Solar Wind (Pioneers 6 & 7)	397A 23	----	399A 26	----	----	402A 30	----	----	----	----	----	----	----
A.13ab	Solar Wind (Pioneers 8 & 9)	----	----	399A 27	----	----	402A 31	----	----	----	----	----	408A 43	----
A.13d	Solar Wind from IPS Measurements	397A 27	398A 27	399A 25	400A 25	401A 29	402A 34	403A 37	404A 31	405A 37	406A 41	407A 35	408A 39	409A 33
A.13e	Solar Plasma (IMP H & J)	402B 23	403B 22	404B 34	408B 81	408B 82	408B 83	408B 61	409B 35					
A.17	Interplanetary Magnetic Field (Pioneer 8)	----	----	----	----	----	----	----	----	----	----	----	----	----
A.17	Interplanetary Magnetic Field (Pioneer 9)	----	----	----	----	----	402A 31	----	----	----	----	----	408A 43	----
A.17c	Inferred IP Magnetic Field	397A 24	398A 28	400A 22	400A 22	401A 30	402A 32	403A 38	404A 32	406A 38	406A 38	407A 38	408A 40	409A 30
A.18	Interplanetary Electric Field (Pioneer 8)	----	----	399A 27	----	----	----	----	----	----	----	----	----	----
A.18	Interplanetary Electric Field (Pioneer 9)	----	----	----	----	----	402A 31	----	----	----	----	----	----	----
B.	IONOSPHERIC (AND RADIO WAVE PROPAGATION) PHENOMENA													
B.52	Graphs of Transmission Frequency Range	398A124	399A128	400A120	401A116	402A132	403A148	404A144	405A158	406A171	407A168	408A168	409A142	
B.53	Quality Figures Based on Frequency Ranges	398A126	399A127	400A122	401A118	402A131	403A150	404A146	405A157	406A170	407A167	408A170	409A144	
C.	FLARE-ASSOCIATED EVENTS													
C.1a	Optical Observations Flares	397A 10	398A 10	399A 10	400A 10	401A 10	402A 12	403A 12	404A 12	405A 12	406A 12	407A 12	408A 12	409A 12
C.1ba	Optical Observations Flares (Standardized Data)	402B 8	403B 8	404B 8	405B 8	406B 8	407B 8	408B 8	409B 8					
C.1d	Flare Patrol Observations	397A 12	398A 13	399A 13	400A 11	401A 14	402A 15	403A 19	404A 16	405A 16	406A 18	407A 19	408A 18	409A 16
C.1d	Flare Patrol Observations	402B 17	403B 21	404B 22	405B 16	406B 25	407A 22	408B 35	409B 24					
C.1e	Flare Indices (by day)	402B 16	403B 20	404B 21	405B 15	406B 24	407A 21	408B 34	409B 23					
C.1f	Flare Indices (by Region)	403B 53	404B 53	405B 38	406B 59	407B 49	408B 77	409B 47						
C.3	Solar Radio Waves - Outstanding Occurrences	402B 18	403B 22	404B 23	405B 17	406B 26	407B 23	408B 36	409B 25					
	Solar Radio Waves - Fixed Frequencies - Selected	397A 17	398A 18	399A 18	400A 16	401A 19	402A 21	403A 25	404A 22	405A 22	406A 24	407A 25	408A 24	409A 22
C.3t	43.25, 80 and 160 MHz Selected Bursts (Culgoora)	399B 36	399A113	401B 44	403B 64	403B 65	405B 45	405B 48	406B 62	407B 67	407A151	408A152	409A129	
C.4a	Solar Radio Spectral Obs. (Fort Davis)	398A107	399A102	400A101	401A102	402A108	403A132	404A122	405A138	406A144	407B 52	408A138		
C.4d	Solar Radio Spectral Obs. (Culgoora)	400B 62	399A102	401B 38	403B 56	403B 59	404B 56	405B 40	406B 64	407B 59	407A139	408A138	409A115	
C.4e	Solar Radio Spectral Obs. (Weissenau)	398A107	399A102	400A101	401A102	402A108	403A132	404A122	405A138	406A144	407A139	408A138	409A115	
C.4f	Solar Radio Spectral Obs. (Sagamore Hill)	398A107	399A102	400A101	401A102	402A108	403A132	404A122	405A138	406A144	407B 52	408A138	409A115	
C.4h	Solar Radio Spectral Obs. (Dwingeloo)	398A107	399A102	400A101	401A102	402A108	403A132	404A122	405A138	----	----	----	----	
C.4i	Solar Radio Spectral Obs. (Durnten)	398A107	399A102	400A101	401A102	402A108	403A132	404A122	405A138	406A144	407A139	408A138	409A115	
C.4j	Solar Radio Spectral Obs. (Manila)		399A102	400A101	401A102	402A108	406B 70	404A122	405A138	406A144	407B 52	408A138	409A115	
C.5e	Solar X-ray (SMS/GOES)	397A 22	399B 37	399A 22	400A 19	401A 24	402A 26	403A 29	404A 26	----	406A 32	407A 29	408A 33	409A 27
C.5f	Solar X-ray (Columbia U.)													
C.6	Sudden Ionospheric Disturbances	398A106	399A100	400A100	401A101	402A106	403A115	404A105	405A120	406A125	407A119	408A120	409A111	
D.	GEOMAGNETIC AND MAGNETOSPHERIC PHENOMENA													
D.1a	Geomagnetic Indices Kp, Km, Ks, Xm, Ap, aa, Cp	398A117	399A120	400A113	401A109	402A125	403A142	404A139	405A151	406A162	407A160	408A160	409A135	
D.1ba	27-day Chart of Kp Indices	398A119	399A122	400A115	401A111	402A127	403A144	404A141	405A153	406A164	407A162	408A162	409A137	
D.1c	27-day Chart of C9	404A142	404A142	404A142	404A142	404A142								
D.1d	Principal Magnetic Storms	398A122	399A125	400A118	401A114	402A130	403A145	404A143	405A156	406A167	407A165	408A165	409A140	
D.1e	Reduced Magnetograms								405A 39					
D.1f	Sudden Commencement and Solar Flare Effects	398A123	399A126	400A119	401A115	403B 69	403A147	405B 55	406B 72	406A169	407A166	408A167	409A141	
D.1g	Equatorial Indices Dst	398A121	399A124	400A117	401A113	402A129	405B 53	405B 54	405A155	406A166	408B 80	408A164	409A139	
D.1h	Geomagnetic Substorm Log (Boulder)								404A 35	405A 38	406A 42	407A 41	408A 44	409A 34
F.	COSMIC RAYS													
F.1a	Cosmic Ray Neutron Counts (Deep River)	398A116	399A115	400A112	402B 47	402A124	403A138	404A138	405A150	407B 70	407A155	408A155		
F.1b	Cosmic Ray Neutron Counts (Climax)	398A116	399A115	400A112	401A108	406B 73	406B 73	406B 73	406B 73	406A161				
F.1e	Cosmic Ray Neutron Counts (Alert)	398A116	399A115	400A112	402B 47	402A124	403A138	404A138	405A150	407B 70	407A155	408A155		
F.1f	Cosmic Ray Neutron Counts (Calgary)	400B 70	400B 70	402B 47										
F.1g	Cosmic Ray Neutron Counts (Sulphur Mountain)	400B 70	----	402B 47										
F.1h	Cosmic Ray Neutron Counts (Thule)													
F.1i	Cosmic Ray Neutron Counts (Kiel)	398A116	399A115	400A112	401A108	402A124	403A138	404A138	405A150	406A161	407A155	408A155	409A134	
F.1j	Cosmic Ray Neutron Counts (Tokyo)	398A116	399A115	400A112	401A108	402A124	403A138	404A138	405A150	406A161	407A155	408A155	409A134	
F.1k	Cosmic Ray Neutron Counts (Kula)	398A116												
H.	MISCELLANEOUS													
H.60	IUWDS Alert Decisions	397A 4	398A 4	399A 4	400A 4	401A 4	402A 5	403A 5	404A 4	405A 4	406A 4	407A 4	408A 5	409A 5
H.62	Abbreviated Calendar Record	403B 46	404B 46	405B 30	406B 52	407B 42	408B 70	409B 40						

Notes:

"398A 36" listed under 1977 Aug means that data for August 1977 were contained in *Solar-Geophysical Data* Number 398 - Part I, beginning on page 36.

A = Part I, B = Part II.

---- = no data available.
blank = data not yet received.

MARCH 1978 DATA

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ACTIVE REGIONS

CARRINGTON ROTATION 1665

(February 14 to March 13, 1978)

Region No.	Coordinates		Age at CMP	IMP.	Spot-less Region	Region No. in Rotation 1654	Activity at West Limb
	Lat.	Long.					
1	29°S	359°	+4	1	x		dispersed
2	25 N	358	-2	2			stable
3	24 S	352	>6	2		(3)	decreasing
4	26 S	349	>6	1	x	(2)	decreasing
5	23 S	334	-2	1	x		dispersed
6	31 S	332	>6	1	x		disappeared
7	21 S	330	>6	1	x		disappeared
8	26 N	314	-3	1	x		disappeared
9	22 N	301	>6	1	x		disappeared
10	17 N	300	+1	1	x		disappeared
11	31 N	282	>6	4			decreasing
12	19 N	261	>6	2			decreasing
13	24 N	261	>6	1	x		dispersed
14	21 N	250	>6	1	x	(6)	decreasing
15	22 S	240	>6	1	x		disappeared
16	20 N	229	-1	4			stable
17	23 N	220	>6	2			stable
18	39 N	191	>6	3			stable
19	18 S	185	>6	3			decreasing
20	19 N	178	>6	1	x		dispersed
21	17 S	168	>6	1	x	(12)	stable
22	17 N	167	>6	1	x		dispersed
23	23 S	158	>6	2			decreasing
24	29 S	155	>6	1	x	(15)	decreasing
25	29 N	145	>6	1	x		dispersed
26	23 S	139	>6	2			decreasing
27	24 N	140	>6	2		(17)	decreasing
28	40 S	136	>6	1	x		dispersed
29	23 S	94	+2	1	x		dispersed
30	15 N	79	>6	2			decreasing
31	22 N	78	>6	4		(22)	decreasing
32	38 S	78	>6	1	x		disappeared
33	28 N	64	>6	1	x	(28+25)	dispersed
34	29 N	61	>6	2			decreasing
35	18 N	34	>6	4		(27)	decreasing

ACTIVE REGIONS

CARRINGTON ROTATION 1666

(March 13 to April 9, 1978)

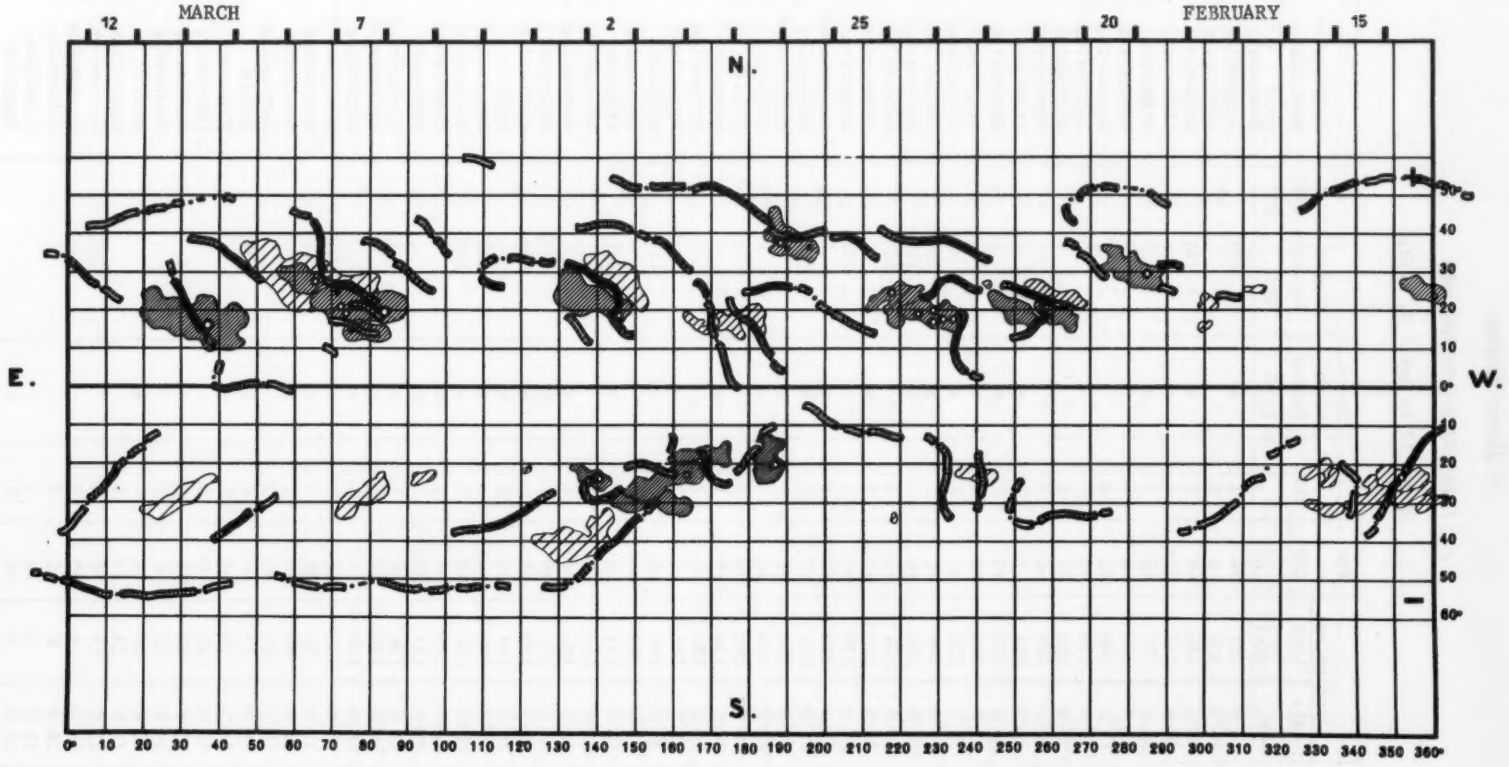
Region No.	Coordinates Lat.	Coordinates Long.	Age at CMP	IMP.	Spot-less Region	Region No. in Rotation 1665	Activity at West Limb
1	2°S	355°	>6	2			decreasing
2	26 N	351	>6	1	x	(2)	decreasing
3	16 N	350	>6	6			decreasing
4	27 S	346	>6	1	x	(4)	dispersed
5	30 N	341	>6	1	x		dispersed
6	24 S	324	-2	1	x		dispersed
7	31 S	316	>6	6			decreasing
8	18 N	286	+1	2			decreasing
9	39 S	278	-2	3			increasing
10	32 N	268	>6	3			decreasing
11	20 N	266	>6	3			decreasing
12	11 N	261	0	1	x		dispersed
13	26 N	258	+3	1	x		decreasing
14	38 N	255	>6	1	x		dispersed
15	32 S	254	+3	1	x		disappeared
16	25 N	246	>6	1	x	(14)	decreasing
17	32 N	246	>6	1	x	(13)	decreasing
18	22 N	231	>6	3		(16)	decreasing
19	31 S	225	+1	1	x		disappeared
20	25 N	220	>6	1	x	(16)	dispersed
21	34 N	218	+3	1	x		disappeared
22	26 N	211	>6	1	x	(17)	decreasing
23	29 S	204	>6	1	x		disappeared
24	15 S	194	>6	1	x		dispersed
25	30 S	193	0	3			stable
26	21 N	186	+5	1	x		dispersed
27	22 S	183	>6	2			decreasing
28	17 N	181	>6	2			decreasing
29	38 N	180	>6	1	x	(18)	dispersed
30	17 N	173	>6	2			decreasing
31	17 S	173	>6	1	x	(21)	dispersed
32	37 N	171	>6	2			decreasing
33	18 S	161	>6	1	x		decreasing
34	23 S	156	>6	1	x	(23)	dispersed
35	21 S	150	>6	1	x	(24)	decreasing
36	28 N	147	-3	1	x		stable
37	22 S	146	>6	1	x	(26)	decreasing
38	29 S	139	>6	1	x	(28)	decreasing
39	14 N	138	0	1	x		dispersed
40	29 N	137	>6	1	x		dispersed
41	21 N	136	>6	1	x		disappeared
42	38 N	134	>6	1	x		disappeared
43	11 N	130	-3	1	x		increasing
44	28 S	108	>6	1	x		disappeared
45	12 N	93	>6	1	x		decreasing
46	22 N	89	>6	1	x		decreasing
47	18 S	77	+5	2			decreasing
48	21 N	77	>6	1	x	(31)	stable
49	14 S	73	-2	1	x		dispersed
50	23 N	73	0	5			increasing
51	15 S	62	>6	2			decreasing
52	32 N	60	+6	2			decreasing
53	35 N	46	-2	1	x		stable
54	17 N	38	>6	4			decreasing
55	23 N	19	>6	4		(35)	decreasing
56	26 S	6	+5	2			decreasing
57	26 S	6	-2	2			decreasing
58	15 N	5	>6	2			decreasing
59	32 N	2	>6	1	x		dispersed

SYNOPTIC SOLAR MAP

CARRINGTON ROTATION 1665

FEBRUARY 14 TO MARCH 13, 1978

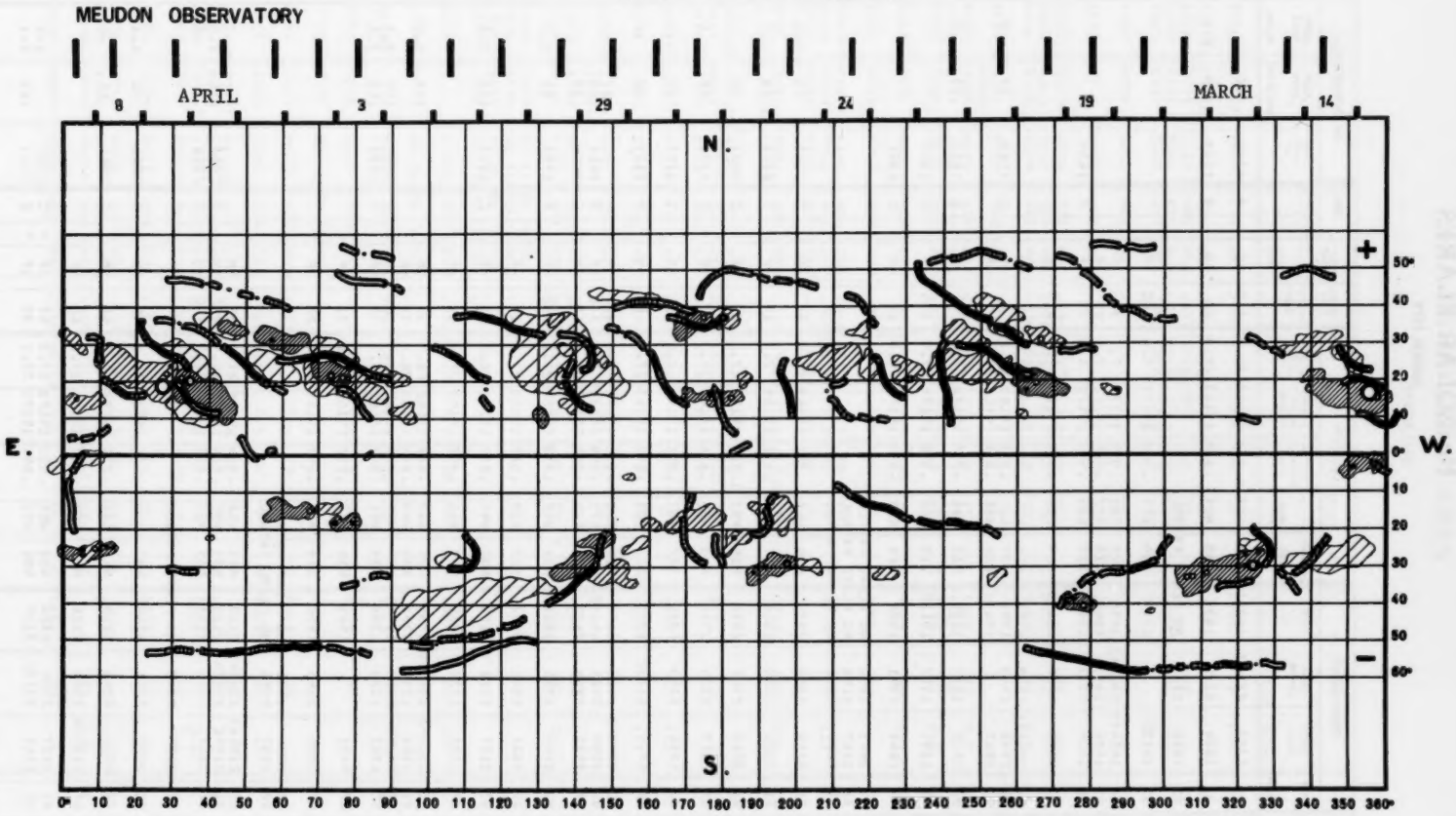
MEUDON OBSERVATORY



SYNOPTIC SOLAR MAP

CARRINGTON ROTATION 1666

MARCH 13 TO APRIL 9, 1978



7 Mar 78

Hα SOLAR FLARES

MARCH 1978

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN		COND.	TYPE	TIME UT	MEAS. AREA Mil. of Disk	CORR AREA Sq. Deg.		
	MAR																	
280 CULG	01	0350	0359U	0404D	N28	W85	1.000	15160	22.8	14D	-F		P	0359	40			Y5
281 ABST	01	1004	1008	1030	S19	W21	.400	15163	27.8	26	-N		P	1008	175	2.0	EU	Y5
	01	1851	1143	NO FLARE PATROL														
282 KANZ	01	1403E		1409	N19	E77	.985	15172	7.4	6D	-F							Y5
GRP66283	01	1424+2	1432+1	1455	N18	E81	.994	15172	7.7	31	-F						D	
KANZ	01	1424	1433	1449	N19	E77	.985	15172	7.4	25	-F							
MCMA	01	1426	1432	1501	N18	E85	.999	15172	8.0	35	-F		C	1432			D	
284 KANZ	01	1506	1532	1547D	N19	E76	.983	15172	7.3	41D	-F							Y5
GRP66285	01	1546+1	1548	1551	N36	W35	.812	15162	27.0	5	-N						D	
MCMA	01	1546	1548	1551	N37	W35	.819	15162	27.0	5	-N		C	1548	25	.5	D	
KANZ	01	1547		1547D	N36	W36	.818	15162	27.8		-F							
286 MCMA	01	1816	1817	1825	S22	E16	.364	15170	3.0	9	-N		C	1817	50	.5	EH	Y5
287 MCMA	01	1855	1907	1912D	N19	E82	.996	15172	7.9	17D	-F		C	1907			E	Y5
288 MCMA	01	1948	1951	1958	N19	E80	.993	15172	7.8	10	-N		C	1951			D	Y5
	01	2002	2056	NO FLARE PATROL														
	01	2147	2155	NO FLARE PATROL														
	01	2206	2222	NO FLARE PATROL														
289 CULG	01	2235	2308	2335	N35	W40	.835	15162	26.9	60	-N		C	2308	50	1.8	FK	Y5
290 CULG	01	2306	2309	2324	N19	E04	.446	15168	2.3	18	-F		C	2309	20	.2		Y5
291 CULG	01	2309	2322	2331	N16	W90	1.001	15161	23.2	22	-F		C	2322	20			Y5
292 CULG	01	2313	2325	2350	N39	W35	.834	15162	27.3	37	-F	*	C	2325	80	1.4	F	Y5
293 CULG	02	0206	0218	0300	S27	W07	.356	15166	1.6	54	-F		C	0218	90	1.0		Y5
294 CULG	02	0333	0333U	0341	S21	W35	.595	15163	27.5	8	-N		P	0333	30	.4		Y5
GRP66295	02	0358+3	0404+1	0420	N20	E73	.973	15172	7.6	22	1F				80		E	
CULG	02	0358	0405	0416D	N19	E71	.964	15172	7.5	18D	1F		P	0405	80			
MITK	02	0401	0404	0420	N22	E76	.985	15172	7.9	19	1N		C	0404	80		E	
296 ABST	02	0749	0753	0808D	N36	W45	.870	15162	27.0	19D	-F		P	0753	52	1.0	D	Y5
297 KANZ	02	0937	0941	0952	S20	W38	.629	15163	27.6	15	-F							Y5
298 LVOV	02	1127	1130	1150	N35	W49	.887	15162	26.8	23	-F		C	1130	100	2.0	EJ	Y5
299 KANZ	02	1228	1235	1239	N35	W44	.859	15162	27.2	11	-F							Y5
GRP66300	02	1320+3	1328+2	1355	N35	W49	.887	15162	26.9	35	1N				120	2.5	J	
KANZ	02	1320	1330	1351	N36	W49	.892	15162	26.9	31	-N							
MCMA	02	1322E	1329	1358D	N35	W48	.882	15162	27.0	36D	1N		C	1329	100	2.7	F	
LVOV	02	1323	1328	1355	N35	W51	.898	15162	26.7	32	1F		C	1328	150	3.6	EJ	
301 KANZ	02	1432		1509	N35	W48	.882	15162	27.0	37	-F							Y5
302 KANZ	02	1436	1446	1458	S19	W40	.650	15163	27.6	22	-F							Y5
	02	1524	1530	NO FLARE PATROL														
	02	1553	2055	NO FLARE PATROL														
GRP66303	02	2055+2	2058+3	2120	N35	W52	.904	15162	27.0	25	-N						F	
CULG	02	2055E	2058U	2120	N36	W55	.919	15162	26.7	25D	1N		P	2058	110	2.4	FT	
RAMY	02	2057	2101	2103D	N35	W50	.893	15162	27.1	6D	-N		C	2101		.3		
	02	2139	2148	NO FLARE PATROL														
304 CULG	02	2205	2216	2240	N37	W50	.901	15170	27.2	35	-N	*	C	2216	80	1.8	FTE	Y5
305 CULG	02	2233	2248	2315	S23	E01	.272	15170	3.0	42	-N		C	2248	60	.6	L	Y5
GRP66306	02	2237>9	2304 2313	2326	N37	W52	.911	15170	27.0	49	1F						FK	
PALE	02	2237	2304	2324	N39	W53	.923	15170	27.0	47	1F	*	C	2304		1.6		
CULG	02	2248	2313U	2327	N35	W51	.898	15170	27.1	39	1F	*	C	2313	140	3.1	FKT	

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OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN		COND	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
	MAR																	
307 CULG	02	2316	2435U	0435	S35	E19	.542		4.4	319	1F		C	2435	200	2.4	S	Y5
GRP66308	02	2328+0	2330+1	2338	N34	W49	.883	15162	27.3	10	1B						JV	
MANI	02	2328	2330	2336	N34	W49	.883	15162	27.3	8	-N		V		50			
CULG	02	2328	2331	2341	N34	W48	.877	15162	27.4	13	1B		C	2331	100	2.2	VTJ	
PALE	02	2328	2331	2338	N39	W53	.923	15162	27.0	10	1B		C	2331		1.7		
309 CULG	03	0220	0225	0233	N33	W50	.885	15162	27.3	13	-N		C	0225	40	.9	T	Y5
310 CULG	03	0239	0241	0253	N22	W90	1.001	15161	24.4	14	1N		C	0241	50			Y5
GRP66311	03	0445+1	0449+0	0504	S23	W02	.274	15170	3.0	19	-N				80	.8		
CULG	03	0445	0449	0507	S23	W02	.274	15170	3.0	22	-N		C	0449	70	.7		
MITK	03	0446	0449	0500	S23	W03	.276	15170	3.0	14	-N		C	0449	90	1.0		
GRP66312	03	0458>9	0525 0543	0554	N36	W53	.913	15162	27.2	56	1F						FJZ	
CULG	03	0458	0525	0554	N35	W53	.909	15162	27.2	56	1F		C	0525	130	2.9	T	
ABST	03	0541	0543	0548	N39	W55	.932	15162	27.1	7	1F		C	0543	96		FJZ	
ABST	03	0546	0548	0554	N35	W52	.904	15162	27.3	8	-F		C	0548	87	2.0	DJ	
313 ABST	03	0618E	0624	0626D	N18	E56	.872	15172	7.5	8D	-F		P	0624	96	1.9	EJ	Y5
314 ABST	03	0700	0704	0713	N28	E69	.967	15172	8.5	13	1F		C	0704	87		DJ	Y5
GRP66315	03	0719+0	0723+3	0745	N18	E52	.840	15172	7.2	26	-N						EJ	
ABST	03	0719	0723	0748	N18	E52	.840	15172	7.2	29	1N		C	0723	183	3.4	EJ	
KANZ	03	0719	0726	0741	N18	E53	.849	15172	7.3	22	-F							
316 ABST	03 IMP.1 NO	0751	0754 KANZ2	0803 CATA2	S14	W58	.841	15163	27.0	12	?F		P	0754	192	3.6	EU	Y5
GRP66317	03	0800+3	0821+5	0838	S25	W15	.388	15166	2.2	38	-F						DG	
ABST	03	0800	0821	0835D	S25	W15	.388	15166	2.2	35D	-F		P	0821	79	.9	DG	
KANZ	03	0803	0826	0838	S25	W15	.388	15166	2.2	35	-F						D	
318 ABST	03	0929E	0931	0939D	N17	E58	.885	15172	7.7	10D	-F		C	0931	87	1.8	DJ	Y5
319 ABST	03	1054	1059	1101D	S14	W62	.876	15163	26.8	7D	-N		P	1059	87	1.8	D	Y5
GRP66320	03	1132+8	1140 1148	1231	S26	W04	.328	15170	3.2	59	-8							
MONT	03	1132	1148	1226	S25	W04	.312	15170	3.2	54	-N		C	1148	80			
CATA	03	1140	1140	1235	S27	W05	.347	15170	3.1	55	1B	2	C	1140	196	2.1		
	03	1355	1405	NO FLARE PATROL														
	03	1456	1505	NO FLARE PATROL														
	03	1625	1639	NO FLARE PATROL														
	03	1835	1948	NO FLARE PATROL														
321 HCMA	03	1925E		1959D	N18	E48	.806	15172	7.4	34D	-N		P	1925	80	1.4	E	Y5
	03	1959	2054	NO FLARE PATROL														
322 HCMA	03	2103E		2111D	N36	W63	.957	15162	27.2	8D	-N		P	2106	25	.9	D	Y5
323 CULG	03	2203	2206	2217	N39	W66	.972	15162	27.0	14	-N		C	2206	50			Y5
	03	2218	2222	NO FLARE PATROL														
324 CULG	04	0004	0014	0023	N35	W88	1.001		25.4	19	-N		C	0014	20			Y5
325 CULG	04	0012	0019	0026	S34	E52	.817	15173	7.9	14	-F		C	0019	20	.2		Y5
GRP66326	04	0020>9	0052+3	0114D	N17	E44	.764	15172	7.3	54	1N				180	2.7	F	
CULG	04	0020	0053	0220	N15	E45	.764	15172	7.4	120	1B		C	0053	150	2.3	F	
MITK	04	0046	0052	0114	N17	E43	.754	15172	7.3	28	1N		C	0052	220	3.4	E	
MANI	04	0053	0055	0100D	N18	E44	.769	15172	7.3	7D	1N		V		180	2.8	F	
327 CULG	04	0028	0034	0109	N16	E30	.612		6.3	41	-F		C	0034	40	.5		Y5
GRP66328	04	0232	0246	0400	N25	E51	.859	15172	7.9	88	1N						F	
CULG	04	0232	0246	0400	N25	E53	.873	15172	8.1	88	1N		C	0246	190	3.8		
MANI	04	0258E	0258U	0304D	N26	E49	.848	15172	7.8	6D	1N		P		200	3.6	F	
329 CULG	04	0550	0602	0614	S27	W13	.396	15170	3.3	24	-N		C	0602	70	.8		Y5

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	DATE MAR	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONC	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg		
GRP66330	04	0720E	0725	0747	S16	W71	.939	15163	27.0	27	-F						FJK	
ABST	04	0720E	0725	0747	S16	W71	.939	15163	27.0	27D	1F		P	0725	87		FJK	
KANZ	04	0725E		0747	S16	W72	.944	15163	26.9	22D	-F							
331 ABST	04	0842	0844	0849	N18	E41	.740	15172	7.4	7	-F		C	0844	96	1.4	EJ	Y5
332 ABST	04	1027	1032	1042	N18	E40	.730	15172	7.4	15	-F		C	1032	79	1.1	DJ	Y5
GRP66333	04	1215>9	1225 1232	1347	N18	E39	.720	15172	7.4	92	1N						FIJ	
CATA	04	1215	1225	1230D	N18	E39	.720	15172	7.4	15D	1B	2	P	1225	224	3.3		
KANZ	04	1221		1340D	N18	E39	.720	15172	7.4	79D	-N							
LVOV	04	1227	1232	1320	N17	E39	.714	15172	7.4	53	1F		C	1232	150	2.3	EIJ	
WEND	04	1229E		1353	N17	E39	.714	15172	7.4	84D	1N		P		500	7.2	FT	
MCMA	04	1306E		1430D	N18	E39	.720	15172	7.5	84D	1N		C	1322	135	2.0	F	
334 LVOV	04	1246	1248	1300	N37	W67	.972	15162	27.5	14	1F		C	1248	100		DH	Y5
335 MCMA	04	1310	1317	1329	N38	W72	.986	15162	27.1	19	-N		C	1317			D	Y5
GRP66336	04	1320>9	1340+8	1418	S18	W75	.959	15163	26.9	58	-N				40		D	
MCMA	04	1320	1340	1430D	S18	W75	.959	15163	26.9	70D	-N		C	1340	30	1.2	D	
LVOV	04	1335	1340	1406	S18	W76	.964	15163	26.9	31	-F		C	1340	50		D	
KANZ	04	1340E		1340D	S15	W75	.960	15163	26.9		-N							
GRP66337	04	1540	1545	1555	N38	W70	.982	15162	27.4	15	-B						DH	
MCMA	04	1540	1545	1555	N38	W70	.982	15162	27.4	15	-B		C	1545			DH	
WEND	04	1546E		1553D	N37	W73	.988	15162	27.2	7D	1N		V		500	25.0	D	
CATA	04	1550E	1550	1550D	N38	W66	.971	15162	27.7		-B	1	P	1550	56			
338 MCMA	04	1618		1637	N38	W80	.998	15162	26.7	19	-F		C	1620			D	Y5
339 MCMA	04	1642E	1645	1648D	N38	W70	.982	15162	27.4	6D	-N		C	1645			D	Y5
340 MCMA	04	1743	1755	1826D	N18	E36	.685	15172	7.4	43D	-N		C	1755	40	.5	E	Y5
	04	1826	1837	NO FLARE PATROL														
	04	2000	2045	NO FLARE PATROL														
341 CULG	04	2325	2345	0001	S25	W75	.958	15163	27.4	36	-F		C	2345	40			Y5
342 VORO	05	0031	0033	0043	N18	E30	.628	15172	7.3	12	-B		C	0033	27	.3	E	Y5
343 CULG	05	0433	0456	0517	N19	E40	.736	15172	8.2	44	-F		C	0456	100	1.4	F	Y5
GRP66344	05	0520>9	0534	0552	N17	E30	.620	15172	7.5	32	-N						FI	
CULG	05	0520	0552U	0605	N18	E33	.659	15172	7.7	45	1F		C	0552	150	2.0	FI	
HITK	05	0532	0534	0538	N17	E27	.589	15172	7.3	6	-N		C	0534	80	1.0		
	05	1001	1004	NO FLARE PATROL														
	05	1007	1122	NO FLARE PATROL														
345 MCMA	05	1248	1250	1252	N28	E33	.738	15172	8.0	4	-F		C	1250	25	.4	D	Y5
346 MCMA	05	1259	1300	1303	N24	E25	.638	15172	7.4	4	-N		C	1300	30	.5	D	Y5
347 MCMA	05	1430	1445	1520	N23	E28	.653	15172	7.7	50	-N		C	1445	25	.4	D	Y5
	05	1718	1805	NO FLARE PATROL														
	05	1935	1954	NO FLARE PATROL														
	05	2002	2043	NO FLARE PATROL														
348 CULG	05	2153	2159	2216	S27	W90	.998	15163	27.2	23	-F		C	2159	20			Y5
	05	2218	2224	NO FLARE PATROL														
GRP66349	06	0148+2	0156+3	0229	N13	E19	.465	15172	7.5	41	-N				150	1.7	J	
CULG	06	0148	0159	0251	N12	E19	.454	15172	7.5	63	-N		C	0159	80	.9	F	
MANI	06	0149	0156	0207	N13	E19	.465	15172	7.5	18	-F		P		150	1.7	F	
HITK	06	0150	0156	0227	N13	E18	.454	15172	7.4	37	1N		C	0156	180	2.1	E	
VORO	06	0218E		0230	N13	E22	.497	15172	7.7	12D	-B		C	0218	63	.7	CEJ	
350 CULG	06	0629	0633	0642	N18	W53	.849	15168	2.3	13	-N		C	0633	20	.2		Y5
351 CULG	06	0707	0709	0711	S24	W90	.999	15163	27.5	4	-N		C	0709	20			Y5

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OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS		MEASUREMENTS			REMARKS	
	DATE	START	MAX. PHASE	END	APPROX LAT.	APPROX HEG. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN		COND	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg		
	MAR																	
GRP66352	06	0742+2	0751 0758	0801	N13	E15	.425	15172	7.4	19	-F						E	
CULG	06	0742	0758	0802D	N13	E15	.425	15172	7.4	20D	-F		C	0758	60	.7		
HTPR	06	0744	0751	0800	N13	E15	.425	15172	7.4	16	-F		C	0751	60	.6	E	
353 CATA	06	0745	0745	0750	S20	W65	.899	15166	1.4	5	-N	2	C	0745	56	1.3		Y5
354 HTPR	06	0803	0813	0835	N13	E15	.425	15172	7.5	27	-F		C	0813	60	.6	E	Y5
355 HTPR	06	1107E		1113	N20	E14	.508	15172	7.5	6D	-F		C	1111	10	.1		Y5
GRP66356	06	1125+2	1159>9	1418D	N26	E20	.623	15172	8.0	173	2B				900	11.3	FIKLU	
HTPR	06	1125	1205	1418	N25	E20	.611	15172	8.0	173	2B		C	1205	800	10.4	EFIKLU	
MONT	06	1127	1159	1413D	N28	E22	.658	15172	8.1	166D	2B		C	1159	1000		F	
CATA	06	1135	1215	1230D	N25	E18	.598	15172	7.8	55D	3B	2	P	1215	1405	18.0		
MCMA	06	1343E	'	1630D	N26	E14	.587	15172	7.6	167D	1N		P	1415	350	4.4	BFU	
	06	1444	1510	NO FLARE PATROL														
357 HTPR	06	1511	1517	1538	N13	E12	.399	15172	7.5	27	-F		C	1517	60	.6	E	Y5
	06	2005	2102	NO FLARE PATROL														
	06	2106	2124	NO FLARE PATROL														
	06	2133	2256	NO FLARE PATROL														
358 VORO	07	0119	0124	0134	N13	E04	.352	15172	7.4	15	-B		C	0124	36	.4	DJ	Y5
359 VORO	07	0246	0247	0255	N18	W02	.428	15172	7.0	9	-N		C	0247	18	.2	D	Y5
GRP66360	07	0555	0558+4	0607	N16	E47	.788	15175	10.8	12	-N						FJ	
ABST	07	0555	0558	0607	N17	E47	.792	15175	10.8	12	1N		C	0558	175	2.9	FJ	
MANI	07	0601E	0602	0607D	N15	E47	.784	15175	10.8	6D	-F		V		30	.4		
361 ABST	07	0808	0811	0835	S25	W55	.822	15170	3.2	27	-F		C	0811	87	1.5	DG	Y5
GRP66362	07	0818+2	0822+1	0838	N18	E48	.806	15175	10.9	20	-F						DJ	
HTPR	07	0818	0822	0831	N18	E48	.806	15175	10.9	13	-F		C	0822	10	.1		
ABST	07	0820	0823	0845	N19	E49	.819	15175	11.0	25	-F		C	0823	87	1.5	DJ	
363 HTPR	07	1055	1058	1103	N15	E43	.744	15175	10.7	8	-F		C	1058	10	.1		Y5
364 HTPR	07	1204	1212	1218	N18	E46	.787	15175	11.0	14	-F		C	1212	10	.1		Y5
365 HTPR	07	1214	1217	1223	N16	E43	.749	15175	10.7	9	-F		C	1217	30	.4	E	Y5
	07	1703	1713	NO FLARE PATROL														
	07	1822	2054	NO FLARE PATROL														
	07	2112	2128	NO FLARE PATROL														
	07	2130	2139	NO FLARE PATROL														
	07	2210	2218	NO FLARE PATROL														
	07	2225	2235	NO FLARE PATROL														
GRP66366	08	0057+1	0102+2 0250	0252	N13	W09	.377	15172	7.4	115	-N						JK	
VORO	08	0057	0102	0110	N14	W08	.386	15172	7.4	13	-B		C	0102	108	1.2	EJK	
MANI	08	0058	0104	0331	N13	W09	.377	15172	7.4	153	1F		P		320	3.5	F	
CULG	08	0246	0250	0252	N12	W11	.377	15172	7.3	6	-F		P	0250	20	.2		
367 ABST	08	0704E	0706	0711	S23	W81	.981	15166	2.2	7D	?F		P	0706	79		D	Y5
	IMP,1 NO ' CATA2																	
GRP66368	08	0747+6	0753+1	0758	N18	E31	.638	15175	10.6	11	-F						DJY	
KANZ	08	0747	0753	0757	N18	E30	.628	15175	10.6	10	-F						D	
ABST	08	0753	0754	0759	N18	E32	.649	15175	10.7	6	-F		C	0754	87	1.1	DJY	
369 KANZ	08	0856	0904	0907	N21	W17	.542	15172	7.1	11	-F						D	Y5
370 KANZ	08	0907	0918	0922	N16	E26	.569	15175	10.3	15	-F							Y5
371 ABST	08	1035E	1035	1041	S05	E78	.976	15177	14.3	6D	-F		P	1035	70		BD	Y5
372 HTPR	08	1101	1106	1125	N17	E26	.578	15175	10.4	24	-F		C	1106	20	.2	E	Y5
373 KANZ	08	1227	1231	1241	S32	E90	.998	15181	15.3	14	-N							Y5
374 MCMA	08	1330	1334	1338D	N28	W06	.584	15172	8.1	8D	-F		C	1334	25	.3	D	Y5

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OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY			CONF	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
	MAR									MIN.								
375 KANZ	08	1545	1551	1551	N11	E70	.951	15176	13.9	6	-F							Y5
376 HCMA	08	1621	1622	1626	S05	E71	.943	15177	14.0	5	-F		C	1622	20	.6	D	Y5
	08	1756	1841	NO FLARE PATROL														
377 HCMA	08	1917	1920	1926	N18	E20	.531	15175	10.3	9	-N		C	1920	25	.3	DH	Y5
378 HCMA	08	1942	1943	1948	N18	E20	.531	15175	10.3	6	-N		C	1943	35	.4	E	Y5
	08	2003	2052	NO FLARE PATROL														
	08	2201	2207	NO FLARE PATROL														
379 CULG	08	2207E	2207	2220	N18	E18	.513	15175	10.3	13D	-F		P	2207	20	.2		Y5
380 CULG	09	0007	0008	0029	N28	W04	.580	15172	8.7	22	-N		C	0008	10	.1		Y5
381 CULG	09	0055	0110	0137	S27	W36	.635	15174	6.3	42	-N		C	0110	40	.4		Y5
382 CULG	09	0240	0248	0303	S31	E90	.998	15178	15.9	23	-N		C	0248	20			Y5
383 CULG	09	0347	0352	0410	S34	W28	.604	15173	7.1	23	-N		C	0352	40	.5		Y5
384 CULG	09	0405	0408	0420	S29	E90	.998	15178	15.9	15	-N		C	0408	20			Y5
385 CULG	09	0634E	0637	0648	S33	E90	.998	15178	16.0	14D	-N		C	0637	20			Y5
386 CULG	09	0635	0646	0657	S35	W26	.596	15173	7.3	22	-F		C	0646	40	.5	S	Y5
GRP66387	09	0810E	0810+5 0821	0824	N18	E14	.481	15175	10.4	14	-N				60	.7	D	
CATA	09	0810E	0815	08200	N18	E14	.481	15175	10.4	10D	-B	2	P	0815	56	.6		
MANI	09	0810E	0810U	0824	N18	E14	.481	15175	10.4	14D	-N		V		80	.9		
KANZ	09	0811E	0811	08220	N19	E14	.495	15175	10.4	11D	-N							
HTPR	09	0812E		0824	N19	E14	.495	15175	10.4	12D	-N		C	0814	50	.5		
ABST	09	0817E	0821	0827	N18	E14	.481	15175	10.4	10D	-F		P	0821	87	1.0	D	
GRP66388	09	0818+1	0821	0833	S02	E60	.866	15177	13.8	15	-F						E	
KANZ	09	0818		08220	S02	E60	.866	15177	13.8	4D	-F							
ABST	09	0819	0821	0833	S03	E61	.873	15177	13.9	14	1F		C	0821	105	2.1	E	
GRP66389	09	0823+3	0828+2 0839+8	0855	N29	W12	.616	15172	8.4	32	-N						K	
HTPR	09	0823	0828	0902	N29	W12	.616	15172	8.4	39	-N		C	0840	80	.9		
ABST	09	0824	0834	08360	N29	W10	.609	15172	8.6	12D	-F		P	0834	96	1.2	FK	
ABST	09	0826	0828	0834	N35	W14	.698	15172	8.3	8	-F		C	0828	87	1.2	D	
ABST	09	0826	0829	08360	N27	W11	.586	15172	8.5	10D	-F		P	0829	114	1.4	F	
KIEV	09	0827E	0846	09120	N30	W10	.622	15172	8.6	45D	1N		C	0846	350	4.4	E	
ATHN	09	0827E	0839	08400	N25	W14	.574	15172	8.3	13D	-F			0839	66	.8		
KANZ	09	0828E	0847	0854	N30	W12	.629	15172	8.5	26D	-N							
MANI	09	0828E	0830	0905D	N23	W13	.542	15172	8.4	37D	-N		V		150	1.8		
KANZ	09	0828E		0832	N36	W12	.703	15172	8.5	4D	-F							
CATA	09	0830E	0840	09000	N30	W10	.622	15172	8.6	30D	2B	2	P	0840	393	5.1		
LOCA	09	0840E	0840	0905	N28	W10	.595	15172	8.6	25D	1N		S	0840	204	2.6		
KHAR	09	0844E	0844	09000	N28	W12	.603	15172	8.5	16D	-F		P				E	
GRP66390	09	0948+2	0952+1	1010	N12	E53	.830	15176	13.4	22	-F						D	
HTPR	09	0948	0952	1011	N13	E52	.824	15176	13.3	23	-F		C	0952	20	.3		
KANZ	09	0949	0953	1008	N12	E53	.830	15176	13.4	19	-F						D	
CATA	09	0950	1000	10000	N12	E53	.830	15176	13.4	10D	-B	2	P	1000	39	.7		
KHAR	09	0953E	0953	10100	N12	E55	.848	15176	13.5	17D	-F		C				D	
GRP66391	09	0955>9	1015+2	1044	S37	E90	.997	15178	16.2	49	-N							
KHAR	09	0955E	1017	10500	S37	E90	.997	15178	16.2	55D	1F		P					
KANZ	09	1008	1015	1037	S38	E90	.997	15178	16.2	29	-N							
392 KANZ	09	1200	1208	1220	S32	E90	.998	15178	16.3	20	-N							Y5
393 HCMA	09	1252	1254	1301	N19	E12	.481	15175	10.4	9	-N		C	1254	50	.6	D	Y5
394 HCMA	09	1840		1844D	S35	E90	.997	15178	16.5	4D	-F		C	1840			EH	Y5
395 HCMA	09	1913	1915	1935	S35	E90	.997	15178	16.6	22	-F		C	1915			H	Y5
396 HCMA	09	1928	1933	1938	N26	W26	.666	15172	7.9	10	-N		C	1933	15	.2	D	Y5
	09	2004	2046	NO FLARE PATROL														

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP. DAY	MIN.		CONG	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg		
	MAR																	
GRP66397	09	2103+3	2107+1	2120	N16	E05	.403	15175	10.3	17	-B				50	.5	E	
MCMA	09	2103	2108	2120	N17	E05	.418	15175	10.3	17	-B		C	2108	50	.6	E	
CULG	09	2106	2107	2115D	N16	E05	.403	15175	10.3	9D	-B		C	2107	50	.5		
	09	2159	2218	NO FLARE PATROL														
	09	2232	2240	NO FLARE PATROL														
398 CULG	10	0049	0050	0103	N14	E54	.845	15176	14.1	14	-F		C	0050	60	1.0	F	Y5
GRP66399	10	0104+1	0107 0115	0145	N13	E45	.756	15176	13.4	41	-N						FV	
CULG	10	0104	0115	0145	N13	E44	.745	15176	13.3	41	1N		C	0115	220	3.3	V	
MANI	10	0105	0107	0134D	N13	E46	.766	15176	13.5	29D	-N		P		130	2.0	F	
	10	0135	0136	NO FLARE PATROL														
400 CULG	10	0530E	0530E	0553	N15	E00	.378	15175	10.2	23D	-N		P	0530	30	.3		Y5
401 CULG	10	0542	0551	0553	N27	W26	.676	15172	8.3	11	-F		C	0551	40	.5		Y5
402 CULG	10	0628	0655U	0707D	N27	W25	.668	15172	8.4	39D	-N		P	0655	120	1.6	F	Y5
403 CULG	10	0657	0702	0707D	N18	E01	.427	15175	10.4	10D	-B		P	0702	90	1.0		Y5
GRP66404	10	0750+5	0756+1	0804	S32	E79	.974	15178	16.3	14	-N						E	
KANZ	10	0750	0757	0804	S31	E80	.977	15178	16.3	14	-N							
MONT	10	0753	0756	0807	S33	E82	.983	15178	16.5	14	-N		C	0756	60		E	
HTPR	10	0755	0756	0800	S32	E76	.963	15178	16.0	5	-F		C	0756	20			
GRP66405	10	0830+5	0833+3	0844	N16	W02	.396	15175	10.2	14	-N				120	1.3	D	
KANZ	10	0830	0834	0838	N16	W02	.396	15175	10.2	8	-N							
HTPR	10	0830	0836	0843	N17	W02	.412	15175	10.2	13	-N		C	0836	70	.7		
MONT	10	0830	0833	0845	N16	W01	.395	15175	10.3	15	-N		C	0833	150		D	
CATA	10	0835	0835	0845	N16	W02	.396	15175	10.2	10	-B	2	C	0835	140	1.5		
GRP66406	10	0852+2	0856+1	0912	S33	E85	.990	15178	16.7	20	-F						D	
KANZ	10	0852	0856	0922	S33	E86	.992	15178	16.8	30	-F							
MONT	10	0854	0857	0902	S34	E85	.990	15178	16.7	8	-F		C	0857	20		D	
GRP66407	10	0925		0942	N14	E47	.780	15176	13.9	17	-N							
CATA	10	0925	0930	0930D	N13	E47	.776	15176	13.9	5D	-B	2	P	0930	56	.9		
HTPR	10	0928E		0942	N15	E48	.794	15176	14.0	14D	-F		C	0931	20	.3		
GRP66408	10	1052+1	1053+3	1110	S34	E79	.974	15178	16.4	18	-N						ELP	
KANZ	10	1037	1056	1118	S37	E80	.977	15178	16.4	41	-N						EPL	
HTPR	10	1052	1053	1101	S32	E74	.954	15178	16.0	9	-F		C	1053	20			
MONT	10	1053	1055	1057D	S34	E83	.985	15178	16.7	4D	-N		C	1055	60			
409 MONT	10	1150	1152	1158	S30	E85	.990	15178	16.9	8	-F		C	1152	40		E	Y5
GRP66410	10	1155+6	1200+3	1215	N17	W02	.412	15175	10.3	20	-N				40	.4		
KANZ	10	1155	1200	1217	N19	E00	.442	15175	10.5	22	-F							
HTPR	10	1159	1203	1221	N17	W04	.416	15175	10.2	22	-N		C	1203	60	.6		
MONT	10	1200	1202	1213	N16	W03	.398	15175	10.3	13	-F		C	1202	40		D	
RAMY	10	1201	1202	1213	N17	W01	.411	15175	10.4	12	-B	3	C		29		F	
411 RAMY	10	1216	1218	1234	N26	W24	.651	15172	8.7	18	-B	3	C		18		F	Y5
412 RAMY	10	1239	1242	1246	N26	W24	.651	15172	8.7	7	-N	3	C		31		F	Y5
413 KANZ	10	1311	1348	1407	S28	W90	.998	15170	3.8	56	-N							Y5
GRP66414	10	1358+2	1404+3	1432	N12	E38	.674	15176	13.4	34	-F				25	.3	D	
MCMA	10	1358	1407	1417D	N12	E39	.686	15176	13.5	19D	-N		C	1407	25	.3	D	
HTPR	10	1400	1404	1432	N13	E38	.680	15176	13.4	32	-F		C	1404	20	.2		
415 HTPR	10	1451	1453	1454	N16	W06	.407	15175	10.2	3	-F		C	1453	20	.2		Y5
416 RAMY	10	1505	1505	1517	S26	E78	.971	15178	16.5	12	-N	3	C		14			Y5
417 RAMY	10	1519	1522	1528	S31	E78	.970	15178	16.5	9	-N	3	C		45			Y5
GRP66418	10	1637+4	1643 1715+4	1749	S32	E77	.967	15178	16.5	72	-B				30		E	
RAMY	10	1637	1719	1749	S31	E77	.967	15178	16.5	72	-B	2	C		33			
MCMA	10	1641	1643	1655	S33	E77	.967	15178	16.5	14	-B		C	1643	40	1.8	E	
MCMA	10	1705	1715	1717D	S33	E77	.967	15178	16.5	12D	-N		C	1715	25	1.0	E	

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP. DAY	MIN.		CONC	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg		
	MAR																	
GRP66419	10	1658+0	1700	1717D	N27	E61	.929	15179	15.3	19	-F				20		E	
HTPR	10	1658		1706D	N28	E62	.936	15179	15.4	8D	-F		C	1703	20	.4		
MCMA	10	1658	1700	1717D	N27	E60	.923	15179	15.2	19D	-F		C	1700	20	.7	E	
	10	1717	1727	NO FLARE PATROL														
	10	1814	1825	NO FLARE PATROL														
420 MCMA	10	1915	1917	1920	S33	E76	.963	15178	16.5	5	-N		C	1917	30	1.2	E	Y5
GRP66421	10	1915E	1926+0	1954	N14	W04	.368	15175	10.5	39	-N				35	.4	L	
MCMA	10	1915E	1926	1950	N13	W05	.356	15175	10.4	35D	-N		C	1926	30	.3	EL	
PALE	10	1923E	1926U	1958D	N15	W04	.384	15175	10.5	35D	-N	3	C		40		F	
	10	2004	2103	NO FLARE PATROL														
422 CULG	10	2210	2217	2255	S34	E77	.967	15178	16.7	45	2N		C	2217	280		FI	Y5
GRP66423	10	2256>9	2330+1	2349	N26	W34	.730	15172	8.4	53	-F				110	1.6		
CULG	10	2256	2331	0000	N27	W34	.737	15172	8.4	64	-N		C	2331	110	1.7		
MITK	10	2329	2330	2337	N26	W35	.738	15172	8.4	8	-F		C	2330	110	1.7		
424 CULG	10	2359	2403	0015	S34	E73	.950	15178	16.5	16	-F		C	2403	50			Y5
425 CULG	11	0144	0149	0155	S04	E36	.587	15177	13.8	11	-F		C	0149	50	.6		Y5
426 CULG	11	0231U	0257U	0500U	N12	E33	.616	15176	13.6	149D	-F		C	0257	60	.7	IS	Y5
427 CULG	11	0323	0327	0336	N12	W08	.355	15175	10.5	13	-F		C	0327	30	.3		Y5
GRP66428	11	0404+5	0413+2	0450	N24	W38	.749	15172	8.3	46	1N				150	2.2	EJ	
CULG	11	0404	0415	0508	N24	W37	.740	15172	8.4	64	-N		C	0415	110	1.7	F	
VORO	11	0405	0413	0442	N28	W38	.776	15172	8.3	37	1N		C	0413	134	2.2	EJ	
MITK	11	0409	0414	0450	N24	W38	.749	15172	8.3	41	1B		C	0414	220	3.4	E	
429 CULG	11	0446	0450	0500	N18	W09	.450	15175	10.5	14	-F		C	0450	40	.4		Y5
430 CULG	11	0504	0506	0511	N18	W10	.455	15175	10.5	7	-F		C	0506	30	.3	F	Y5
431 CULG	11	0659	0705	0723	N28	E50	.864	15179	15.0	24	-F		C	0705	40	.8		Y5
GRP66432	11	0733+2	0736+4	0754	S34	E67	.920	15178	16.3	21	-N				70		E	
CULG	11	0733	0739	0741D	S34	E70	.936	15178	16.6	8D	-N		P	0739	70			
MITK	11	0733	0737	0754	S33	E67	.919	15178	16.3	21	-F		C	0737	70		E	
HTPR	11	0733	0736	0743	S34	E64	.902	15178	16.1	10	-N		C	0736	50	1.0	E	
CATA	11	0735	0740	0755	S34	E68	.926	15178	16.4	20	1B	2	C	0740	140			
433 HTPR	11	0800	0803	0810	N14	E36	.663	15176	14.0	10	-F		C	0803	20	.2	E	Y5
434 HTPR	11	0915	0916	0924	N25	W43	.797	15172	8.2	9	-F		C	0916	20	.3	E	Y5
435 HTPR	11	0950	1015	1054	N12	E26	.533	15176	13.4	64	-F		C	1015	30	.3		Y5
436 HTPR	11	1136	1138	1145	S29	E68	.922	15178	16.6	9	-F		C	1138	20	.3		Y5
437 RAMY	11	1153	1155	1237	S31	E67	.918	15178	16.5	44	-N	3	C		22			Y5
GRP66438	11	1226+2	1227+2	1239	N16	W15	.463	15175	10.4	13	-N				60	.7	E	
HTPR	11	1226	1227	1240	N18	W16	.496	15175	10.3	14	-N		C	1227	60	.6	E	
RAMY	11	1228	1229	1238	N15	W14	.442	15175	10.5	10	-B	3	C		71			
GRP66439	11	1300+1	1304+2	1316	N25	W43	.797	15172	8.3	16	-N				60	1.0	E	
HTPR	11	1300	1304	1312	N25	W42	.789	15172	8.4	12	-N		C	1304	50	.6	E	
RAMY	11	1301	1306	1320	N26	W44	.810	15172	8.2	19	-B	3	C		67			
GRP66440	11	1326+2	1331+1	1338	S32	E64	.900	15178	16.4	12	-N				40			
HTPR	11	1326	1331	1336	S33	E63	.895	15178	16.3	10	-F		C	1331	40	.8		
RAMY	11	1328	1332	1339	S31	E66	.912	15178	16.5	11	-B	3	C		41			
441 RAMY	11	1356	1403	1410	S31	E66	.912	15178	16.5	14	-N	3	C		50			Y5
GRP66442	11	1402+1	1404+0	1412	N21	W54	.866	15172	7.5	10	-N				35	.7	E	
HTPR	11	1402	1404	1408	N22	W54	.870	15172	7.5	6	-F		C	1404	20	.3	E	
RAMY	11	1403	1404	1416	N20	W55	.871	15172	7.5	13	-B	3	C		52			
443 HTPR	11	1524	1528	1546	N13	E25	.530	15176	13.5	22	-F		C	1528	10	.1		Y5

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONF	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
	MAR																	
GRP66444	11	1625+3	1629+0	1637	N26	W45	.818	15172	8.3	12	-N				20	.3		
HTPR	11	1625	1629	1638	N27	W45	.823	15172	8.3	13	-F		C	1629	10	.1		
RAMY	11	1628	1629	1636	N26	W46	.826	15172	8.2	8	-B	3	C		30			
	11	1656	2105	NO FLARE PATROL														
445 RAMY	11	1713	1715	1722	N14	E27	.562	15176	13.7	9	-B	3	C		33		FDE	Y5
446 CULG	11	2106	2130	2200	N11	E21	.465	15176	13.5	54	-F		C	2130	60	.7	FK	Y5
GRP66447	11	2130	2134 2142	2218	S33	E59	.868	15178	16.3	48	1F						F	
CULG	11	2130	2134	2218	S35	E60	.878	15178	16.4	48	1F		C	2134	110	2.2		
PALE	11	2136E	2142U	2151D	S31	E59	.864	15178	16.3	150	-N	3	C		42		F	
GRP66448	11	2305+1	2307+0	2314	N14	E24	.529	15176	13.8	9	-F				35	.4		
CULG	11	2305	2307	2311D	N12	E28	.557	15176	14.1	60	-F		C	2307	30	.4	F	
VORO	11	2306	2307	2314	N16	E20	.508	15176	13.5	8	-N		C	2307	36	.4	E	
GRP66449	11	2325+0	2330+0	2336D	S33	E59	.868	15178	16.4	11	-N				60	1.3	K	
CULG	11	2325	2330	0005	S34	E59	.869	15178	16.4	40	-F		C	2330	60	1.2	FK	
VORO	11	2325	2330	2336	S33	E60	.875	15178	16.5	11	-B		C	2330	63	1.3	D	
GRP66450	11	2346+4	2352+1 2358	0002	S32	E65	.906	15178	16.9	16	-N				40			
PALE	11	2346E	2353	0002	S35	E70	.937	15178	17.2	16D	-N	3	C		44		F	
VORO	11	2350	2352	2359	S33	E64	.901	15178	16.8	9	-B		C	2352	27	.6	E	
VORO	11	2357	2358	0000D	S27	E58	.851	15178	16.3	3D	-B		C	2358	36	.7	D	
GRP66451	11	2359+4	0005+2	0012	N20	W68	.952	15172	6.9	13	-N				35		E	
VORO	12	0003	0005	0011	N20	W68	.952	15172	6.9	8	-B		C	0005	45		E	
CULG	11	2359	2407	0012	N21	W69	.958	15172	6.8	13	-F		C	2407	20			
452 PALE	12	0151	0153	0207	S35	E69	.932	15178	17.3	16	-N	3	C		39		F	Y5
453 VORO	12	0213	0214	0216	N20	W69	.957	15172	6.9	3	-B		C	0214	72		D	Y5
454 VORO	12	0309	0309	0311	N27	E40	.785	15179	15.1	2	-B		C	0303	36	.6	EGJ	Y5
455 VORO	12	0316	0323	0333D	N27	E40	.785	15179	15.1	17D	-B		C	0323	54	.7	EGJK	Y5
456 PALE	12	0353	0355	0403	S35	E68	.926	15178	17.3	10	-N	3	C		72			Y5
457 RAMY	12	1235	1235	1237	N14	E17	.456	15176	13.8	2	-N	3	C		24			Y5
GRP66458	12	1242+2	1243+2	1254	S31	E60	.872	15178	17.0	12	-N				40	.9	E	
HTPR	12	1242	1243	1250	S30	E60	.870	15178	17.0	8	-F		C	1243	30	.4	E	
RAMY	12	1244	1245	1258	S33	E61	.882	15178	17.1	14	-B	3	C		52			
GRP66459	12	1419+2	1423+0	1431D	S34	E58	.862	15178	16.9	12	-N							
KANZ	12	1419	1423	1431	S35	E56	.850	15178	16.8	12	-F							
RAMY	12	1421	1423	1527	S33	E61	.882	15178	17.2	66	-B	3	C		63			
RAMY	12	1421	1510	1527	S33	E61	.882	15178	17.2	66	-F	3	C		14			
	12	1508	1517	NO FLARE PATROL														
460 RAMY	12	1519	1522	1525	N19	W76	.983	15172	6.9	6	-N	3	C		16			Y5
461 PALE	12	1813	1814	1815	S32	E57	.851	15178	17.0	2	-N	3	C		22			Y5
462 PALE	12	1815	1835	1838	S32	E57	.851	15178	17.0	23	-N	3	C		19			Y5
GRP66463	12	1817+1	1819+0	1920	N17	E15	.476	15176	13.9	63	-N				30	.3	E	
RAMY	12	1817E	1819	1821D	N14	E13	.420	15176	13.7	4D	-N	3	C		31			
HCMA	12	1818	1819	1920	N20	E18	.537	15176	14.1	62	-N		C	1819	30	.4	E	
464 RAMY	12	1931	1948	2013	N20	W81	.995	15172	6.7	42	-N	3	C		21		FDE	Y5
	12	1943	2255	NO FLARE PATROL														
465 RAMY	12	2103	2108	2114	S33	E57	.853	15178	17.2	11	-B	3	C		23			Y5
466 RAMY	12	2114	2115	2119	N15	W33	.637	15175	10.4	5	-B	3	C		29			Y5
	13	0217	0223	NO FLARE PATROL														

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	DATE	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR. DAY	MIN.		CONF.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.	
	MAR																
GRP66467	13	0223+1	0225+0	0232	N24	W74	.980	15172	7.5	9	-N				40		F
CULG	13	0223E	0225	0235	N24	W73	.977	15172	7.6	12D	-N		C	0225	40		
PALE	13	0224	0225	0229	N25	W76	.986	15172	7.4	5	-N	3	C		39		F
	13	0400	0410	NO FLARE PATROL													
468 CULG	13	0530	0532	0545	S03	E07	.142	15177	13.8	15	-F		C	0532	20	.2	Y5
	13	0747	0755	NO FLARE PATROL													
469 KHAR	13	0954E	1014	1038D	N26	W90	1.002	15172	6.7	44D	?N		P	1014	165	4.8	H Y5
	IMP.1 NO MONT2																
	13	1042	1050	NO FLARE PATROL													
470 RAMY	13	1356	1402	1452	N25	W76	.986	15172	7.9	56	?B	3	C				FDE Y5
	IMP.1 NO LVOV1																
	13	1410	1449	NO FLARE PATROL													
	13	1450	1457	NO FLARE PATROL													
	13	1537	1618	NO FLARE PATROL													
	13	1625	1630	NO FLARE PATROL													
471 RAMY	13	1659	1702	1720	N23	W84	.999	15172	7.4	21	-B	3	C				F Y5
	13	1710	1752	NO FLARE PATROL													
	13	1754	1807	NO FLARE PATROL													
GRP66472	13	1906+6	1908+8	1924	N12	W07	.349	15176	13.3	18	-N				50	.5	FHL
RAMY	13	1906	1908	1920D	N13	W07	.364	15176	13.3	14D	-B	3	C		64		F H
MCMA	13	1907	1913	1923	N12	W06	.344	15176	13.3	16	-F		C	1913	50	.5	EL
PALE	13	1912	1916	1924	N11	W06	.340	15176	13.2	12	-N	3	C		34		F
473 RAMY	13	1915	1918	1925D	N22	W87	1.000	15172	7.3	10D	-B	3	C				Y5
	13	2004	2022	NO FLARE PATROL													
474 PALE	13	2006E	2008U	2015D	N27	W81	.997	15172	7.8	9D	-N	3	C				F Y5
	13	2110	2157	NO FLARE PATROL													
	13	2209	2250	NO FLARE PATROL													
475 CULG	13	2328E	2328	2332	N15	W90	1.001	15172	7.2	4D	-F		P	2328	20		Y5
GRP66476	13	2328+2	2330+3	2344	N21	W41	.756	15175	10.9	16	1N				180	2.7	FJLUV
PALE	13	2328	2330	2340	N19	W48	.810	15175	10.4	12	-N	*	C		25		F
CULG	13	2329	2332	2353	N21	W40	.747	15175	11.0	24	1N	*	C	2332	200	3.0	JVLU
MITK	13	2330	2333	2345	N20	W41	.751	15175	10.9	15	1F	*	C	2333	170	2.6	
VORO	13	2337E		2343	N23	W40	.759	15175	11.0	6D	1F	*	C	2338	323	4.9	BF
GRP66477	13	2358+3	0003+1	0015	N25	W88	1.000	15172	7.4	17	1N						HK
PALE	14	0001	0003	0007	N25	W83	.998	15172	7.6	6	-N	3	C				F
VORO	14	0001	0004	0015	N23	W90	1.001	15172	7.3	14	1N		C	0004	179		DHK
CULG	13	2358	2404	0017	N26	W90	1.002	15172	7.2	19	1B		C	2404	80		
GRP66478	14	0339	0340+2	0357	S27	E28	.547	15178	16.3	18	-B				120	1.4	J
VORO	14	0339	0342	0356	S26	E29	.551	15178	16.3	17	1B		C	0342	314	3.8	EJ
MANI	14	0340E	0340U	0343D	S27	E27	.536	15178	16.2	3D	-B		V		120	1.4	F
CULG	14	0345E	0345U	0357	S28	E29	.565	15178	16.3	12D	-B		P	0345	90	1.1	CJ
479 CULG	14	0402	0449	0518	N28	W90	1.002	15172	7.4	76	-F		C	0449	20		Y5
480 CULG	14	0506	0511	0523	N12	W11	.376	15176	13.4	17	-F		C	0511	10	.1	Y5
481 CULG	14	0646	0714	0725D	N26	W90	1.002	15172	7.5	39D	1N		P	0714	120		Y5
482 HTPR	14	0803	0806	0808	S36	E35	.682	15178	17.0	5	-F		C	0806	20	.2	Y5
483 CATA	14	0835	0835	0845	S38	E36	.705	15178	17.1	10	-B	2	C	0835	112	1.6	Y5
484 CATA	14	0850	0850	0905	N25	W90	1.001	15172	7.6	15	1F	2	C	0850	56		Y5
	14	1405	1555	NO FLARE PATROL													
485 RAMY	14	1422	1423	1428	N18	E79	.990	15184	20.5	6	-F	3	C				Y5
486 RAMY	14	1516	1517	1520D	N18	E78	.988	15184	20.5	4D	-N	3	C		21		Y5

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	DATE	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONF.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
	MAR																	
487 HCMA	14	1555E		1557D	N18	E81	.994	15184	20.7	2D	-N		P	1557			D	Y5
	14	1557	2106	NO FLARE PATROL														
488 RAMY	14	1655	1658	1703	N13	W17	.443	15176	13.4	8	-N	3	C		18			Y5
489 RAMY	14	1702	1704	1707	S30	E21	.502	15178	16.3	5	-N	3	C		19		F	Y5
490 RAMY	14	1729	1729	1736	N18	E77	.985	15184	20.5	7	-F	3	C		8			Y5
GRP66491	14	1744	1746 1752	1804	N18	E77	.985	15184	20.5	20	-F							
RAMY	14	1744	1746	1804	N18	E77	.985	15184	20.5	20	-F	3	C		13			
RAMY	14	1744	1752	1804	N18	E77	.985	15184	20.5	20	-F	3	C		11			
GRP66492	14	1834+2	1837+1	1848	N18	E74	.975	15184	20.3	14	-F				45			
RAMY	14	1834	1837	1854	N19	E75	.979	15184	20.4	20	-N	3	C		54		FDE	
PALE	14	1836	1838	1841	N17	E73	.971	15184	20.3	5	-F	3	C		41		DE	
493 RAMY	14	1934	1936	1940	N19	E74	.976	15184	20.4	6	-N	3	C		51		F	Y5
494 CULG	14	2213	2221U	2259	S36	E23	.583	15178	16.7	46	-F		C	2221	100	1.3	L	Y5
495 MANI	15	0012E	0013	0022	N17	E76	.981	15184	20.7	10D	-F		P		40	1.0		Y5
496 CULG	15	0030	0043U	0043D	N33	E66	.963	15183	20.0	13D	-F		P	0043	40			Y5
497 VORO	15	0055	0057	0101	N34	E72	.983	15183	20.4	6	-B		C	0057	27		OJ	Y5
GRP66498	15	0131+7	0139+1	0144D	N34	E68	.971	15183	20.2	13	-N				50		DJ	
CULG	15	0131	0139	0215	N33	E67	.966	15183	20.1	44	-N		C	0139	50			
VORO	15	0138	0140	0144	N35	E70	.978	15183	20.3	6	-B		C	0140	63		DJ	
GRP66499	15	0225+9	0235+0	0251	S27	E12	.389	15178	16.0	26	-N				60	.7	DHL	
CULG	15	0225	0235	0302	S27	E12	.389	15178	16.0	37	-N		C	0235	80	.9		
VORO	15	0234	0235	0240	S27	E13	.396	15178	16.1	6	-B		C	0235	54	.5	DHL	
GRP66500	15	0242+1	0244+0	0304	N34	E68	.971	15183	20.2	22	-N				45		DH	
CULG	15	0242	0244	0318	N33	E66	.963	15183	20.1	36	-F		C	0244	40			
VORO	15	0243	0244	0249	N35	E70	.978	15183	20.4	6	-B		C	0244	54		DH	
501 VORO	15	0334E	0336	0338D	N19	W18	.524	15176	13.8	4D	-B		C	0336	63	.8	DH	Y5
GRP66502	15	0343+3	0346+3	0357	N22	E72	.971	15184	20.6	14	-N						D	
CULG	15	0343E	0346	0357	N25	E69	.963	15184	20.3	14D	-F		P	0346		.2		
VORO	15	0346	0349	0357	N19	E75	.979	15184	20.8	11	1B		C	0349	81		D	
GRP66503	15	0347+4	0353+2	0358	N34	E68	.971	15183	20.3	11	1F				100		D	
CULG	15	0347	0355	0359	N35	E67	.969	15183	20.2	12	1F		C	0355	100			
VORO	15	0351	0353	0357	N34	E70	.977	15183	20.4	6	1N		C	0353	99		D	
504 MANI	15	0440	0442	0447	N16	E70	.956	15184	20.4	7	-F		P		30	.7	F	Y5
505 CULG	15	0510	0520U	0532	N18	E70	.959	15184	20.5	22	-F		C	0520	20			Y5
506 CULG	15	0545	0550	0603	N18	E70	.959	15184	20.5	18	-F		C	0550	20			Y5
507 HTPR	15	1030	1039	1048	N18	E70	.959	15184	20.7	18	-F		C	1039	20	.5	E	Y5
	15	1104	1205	NO FLARE PATROL														
GRP66508	15	1235E	1246+0	1315	N18	E67	.944	15184	20.5	40	1B						HU	
RAMY	15	1235E	1246	1315	N19	E65	.935	15184	20.4	40D	1B	2	C		168		U F	
KIEV	15	1240E	1246	1315D	N18	E70	.959	15184	20.8	35D	2N		C	1246	400		EH	
	15	1404	1815	NO FLARE PATROL														
509 RAMY	15	1703	1705	1714	S27	E06	.352	15178	16.2	11	-B	3	C		74			Y5
	15	1855	1908	NO FLARE PATROL														
	15	1909	2058	NO FLARE PATROL														
	15	2205	2210	NO FLARE PATROL														
GRP66510	15	2329+5	2340+2	0045	S29	E02	.373	15178	16.1	76	-N						FG	
VORO	15	2329	2342	0045	S27	E00	.339	15178	16.0	76	1N		C	2342	206	2.2	FG	
PALE	15	2334	2340U	0030D	S31	E04	.409	15178	16.3	56D	-N	3	C		83		F	

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
	MAR																	
511 VORO	16	0035	0036	0039	N19	W68	.950	15175	10.9	4	-N		C	0036	18		D	Y5
512 VORO	16	0216	0219	0222	N18	E61	.908	15184	20.7	6	-N		C	0219	27	.6	D	Y5
GRP66513	16	0216	0219	0222	N18	E61	.908	15178	20.7	6	-N						D	
CULG	16	0211	0232	0300	S26	E07	.342	15178	16.6	49	-F	*	C	0232	35	.4	F	
VORO	16	0229	0232	0235	S26	E10	.360	15178	16.9	6	-B	*	C	0232	63	.6	EHJ	
514 VORO	16	0326	0327	0333	S34	E09	.471	15178	16.8	7	-B		C	0327	27	.3	D	Y5
515 CULG	16	0507	0521	0545	N29	E51	.874	15183	20.0	38	-F		C	0521	50	1.0		Y5
GRP66516	16	0752+3	0805+0	0915D	N17	W30	.619	15176	14.1	83	-F				80	1.0	DJ	
ABST	16	0752E	0805	0902D	N13	W31	.599	15176	14.0	70D	-F		P	0805	87	1.1	DJ	
CATA	16	0755	0805	0915D	N21	W29	.643	15176	14.2	80D	-N	2	P	0805	84	1.1		
	16	1405	1649	NO FLARE PATROL														
	16	1652	1730	NO FLARE PATROL														
	16	1731	1745	NO FLARE PATROL														
	16	1749	1911	NO FLARE PATROL														
517 RAMY	16	1834	1835	1850	S33	W01	.436	15178	16.7	16	-N	3	C		32			Y5
	16	1912	1954	NO FLARE PATROL														
	16	2005	2022	NO FLARE PATROL														
	16	2033	2158	NO FLARE PATROL														
GRP66518	16	2251	2255+1	2313	S25	W07	.327	15178	16.4	22	-N				50	.5	EL	
VORO	16	2251	2255	2313	S26	W08	.347	15178	16.4	22	-B		C	2255	45	.5	EL	
CULG	16	2253E	2256	2306D	S25	W06	.321	15178	16.5	13D	-F		P	2256	50	.5	C	
	17	0538	0546	NO FLARE PATROL														
	17	0555	0603	NO FLARE PATROL														
519 RAMY	17	1150	1154	1230	N18	E42	.749	15184	20.6	40	-N	2	C		98			Y5
520 KANZ	17	1402	1419	1430	N28	W31	.721	15179	15.3	28	-F						G	Y5
	17	1445	1448	NO FLARE PATROL														
	17	1533	1540	NO FLARE PATROL														
GRP66521	17	1533	1550+0 1603	1636	N18	E39	.719	15184	20.6	63	-B				130	1.8	E	
RAMY	17	1533	1550	1636	N18	E40	.729	15184	20.6	63	-B	2	C		137		DE	
RAMY	17	1533	1603	1636	N18	E40	.729	15184	20.6	63	-N	2	C		98		DE	
CATA	17	1540E	1550	1600D	N18	E38	.709	15184	20.5	20D	1B	2	P	1550	168	2.4		
HTPR	17	1549E		1612D	N18	E39	.719	15184	20.6	23D	-N		C	1552	80	1.0	E	
	17	1612	1623	NO FLARE PATROL														
	17	1625	1654	NO FLARE PATROL														
	17	1705	2245	NO FLARE PATROL														
	17	2310	2314	NO FLARE PATROL														
522 VORO	18	0024	0026	0031	S27	W30	.570	15178	15.8	7	-B		C	0026	45	.6	DHL	Y5
523 VORO	18	0304	0305	0314D	S34	W16	.510	15178	16.9	10D	-B		C	0305	45	.5	E	Y5
524 PALE	18	0329	0330	0331D	N16	E32	.632	15184	20.5	2D	-N	3	C		35		F	Y5
GRP66525	18	0337+3	0342+1	0355	N18	E30	.627	15184	20.4	18	-N							
MITK	18	0337	0343	0349	N18	E31	.637	15184	20.5	12	-N		C	0343	90	1.2	E	
MANI	18	0340	0342	0401	N18	E30	.627	15184	20.4	21	1N		P		200	2.5	F	
	18	0600	0625	NO FLARE PATROL														
526 HTPR	18	0800	0802	0813	N19	E30	.635	15184	20.6	13	-N		C	0802	50	.6	E	Y5
527 HTPR	18	0837	0842	0847	N19	E30	.635	15184	20.6	10	-N		C	0842	50	.6	E	Y5
528 HTPR	18	0910	0912	0920	N19	E29	.625	15184	20.6	10	-F		C	0912	30	.3	E	Y5
529 ATHN	18	0958	1000	1029	N28	E26	.684	15183	20.4	31	-B			1000	82	1.1		Y5
GRP66530	18	1043		1138	N30	E23	.684	15183	20.2	47	-N						E	
HTPR	18	1043		1105D	N30	E24	.691	15183	20.2	22D	-N		C	1101	80	.8	E	
LOCA	18	1046E		1114D	N30	E22	.678	15183	20.1	28D	1N		S		163	2.3		
HTPR	18	1108E		1130	N30	E24	.691	15183	20.3	22D	-N		C	1108	70	.8	E	

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OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP. DAY	MIN.		CONC	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg	
	MAR																
531 RAMY	18	1419	1421	1425	N18	E27	.596	15184	20.6	6	-N	3	C		25		Y5
GRP66532	18	1420+2	1423+0	1428	S32	W28	.588	15178	16.5	8	-N				35	.4	DH
MCMA	18	1420	1423	1428	S32	W28	.588	15178	16.5	8	-N		C	1423	30	.4	DH
HTPR	18	1422	1423	1427	S32	W28	.588	15178	16.5	5	-N		C	1423	40	.4	
GRP66533	18	1434+0	1436+0	1449	N13	W62	.905	15176	14.0	15	-F				15	.3	
HTPR	18	1434	1436	1446	N13	W60	.890	15176	14.1	12	-F		C	1436	10	.2	
RAMY	18	1434	1436	1452	N14	W64	.920	15176	13.8	18	-N	3	C		22		
GRP66534	18	1440+0	1442+1	1452	N19	E26	.596	15184	20.6	12	-N				60	.7	E
RAMY	18	1440	1443	1454	N18	E27	.596	15184	20.6	14	-B	3	C		70		
HTPR	18	1440	1443	1451	N19	E25	.586	15184	20.5	11	-N		C	1443	60	.6	E
MCMA	18	1440	1442	1452	N20	E25	.596	15184	20.5	12	-N		C	1442	40	.5	E
GRP66535	18	1628+0	1629+1	1637	N19	E25	.586	15184	20.6	9	-N				50	.6	
RAMY	18	1628	1629	1636	N18	E26	.586	15184	20.6	8	-B	3	C		62		FDE
MCMA	18	1628	1630	1638	N20	E24	.587	15184	20.5	10	-F		C	1630	50	.6	E
	18	1736	2117	NO FLARE PATROL													
536 RAMY	18	1801	1802	1808	N18	E25	.577	15184	20.6	7	-N	3	C		46		DE Y5
	18	2119	2200	NO FLARE PATROL													
537 VORO	18	2241	2242	2244	N20	E25	.596	15184	20.8	3	-N		C	2242	63	.8	D Y5
538 VORO	18	2300	2301	2303	N20	E25	.596	15184	20.8	3	-B		C	2301	45	.6	D Y5
GRP66539	19	0437	0440+4	0459	N30	E13	.631	15183	20.2	22	1N				190	2.4	FU
MANI	19	0437	0440	0459	N30	E12	.627	15183	20.1	22	1N		P		200	2.7	F
TEHR	19	0443E	0444U	0459	N31	E14	.648	15183	20.2	16D	-B	1	C		190		U F
540 MANI	19	0456	0506	0527D	S29	W44	.729	15178	15.9	31D	-F		P		110	1.6	F Y5
	19	0645	0703	NO FLARE PATROL													
	19	0725	0730	NO FLARE PATROL													
	19	0737	0750	NO FLARE PATROL													
	19	0950	1015	NO FLARE PATROL													
	19	1030	1100	NO FLARE PATROL													
	19	1105	1144	NO FLARE PATROL													
541 RAMY	19	1328	1329	1346	S33	W33	.644	15178	17.1	18	-N	2	C		19		Y5
542 RAMY	19	1527	1531	1547	N14	W79	.988	15176	13.7	20	-N	3	C				Y5
GRP66543	19	1714+0	1717	1724	N17	E43	.753	15187	22.9	10	-F				30	.4	HS
MCMA	19	1714	1717	1724	N17	E44	.763	15187	23.0	10	-F		C	1717	40	.6	EH
RAMY	19	1714	1715	1715D	N17	E43	.753	15187	22.9	1D	-N	3	C		20		F S
	19	2000	2200	NO FLARE PATROL													
GRP66544	20	0653	0703	0736	N22	E59	.904	15188	24.7	43	1B						F
MANI	20	0653	0703	0736	N23	E59	.906	15188	24.7	43	1N		P		250	5.0	F
CATA	20	0710E	0710	0715D	N22	E59	.904	15188	24.7	5D	2B	2	P	0710	281	6.7	
	20	0950	1050	NO FLARE PATROL													
	20	1110	1124	NO FLARE PATROL													
545 MCMA	20	1630	1634	1645	N15	E90	1.001	15198	27.4	15	-F		C	1634			Y5
	20	1857	2155	NO FLARE PATROL													
GRP66546	20	2316	2321+6	2347	N18	W04	.428	15184	20.7	31	-N				60	.7	JK
VORO	20	2316	2321	2336	N19	W03	.442	15184	20.7	20	-B		C	2321	63	.7	EJK
CULG	20	2321E	2327U	2357	N18	W05	.431	15184	20.6	36D	-F		P	2327	70	.8	CF
GRP66547	21	0020+3	0024+1	0027	N15	E85	.999	15198	27.4	7	-N						H
VORO	21	0020	0024	0030	N15	E90	1.001	15198	27.8	10	-B		C	0024	108		H
MANI	21	0021	0025	0027	N15	E85	.999	15198	27.4	6	-F		P		40	1.2	
PALE	21	0023	0025	0027	N14	E77	.982	15198	26.8	4	-F	3	C				
548 HTPR	21	0832		0846D	N22	W08	.501	15184	20.8	14D	-F		C	0837	30	.3	E Y5
549 KANZ	21	0952	0955	1003	N22	W07	.497	15184	20.9	11	-F						Y5
	21	1011	1015	NO FLARE PATROL													

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	DATE	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONG	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
	MAR																	
	21	1040	1244	NO FLARE PATROL														
	21	1249	2220	NO FLARE PATROL														
550 RAMY	21	1413	1414	1419	N14	E71	.959	15198	26.9	6	-F	4	C				F	Y5
551 RAMY	21	1420	1421	1429	N19	E39	.724	15188	24.5	9	-F	4	C		23		U F	Y5
552 RAMY	21	1528	1529	1545	N22	E42	.770	15188	24.8	17	-N	3	C		20		U F	Y5
553 PALE	21	2009E	2019U	2026D	N14	E70	.954	15198	27.1	17D	-N	3	C		17		DE	Y5
554 PALE	21	2204E	2204U	2206D	N17	W16	.481	15184	20.7	2D	-B	3	C		135		F	Y5
555 VORO	22	0044	0046	0051	S41	W31	.692	15201	19.7	7	-N		C	0046	90	1.3	DJ	Y5
556 VORO	22	0145	0147	0156	N16	E70	.956	15198	27.3	11	-B		C	0147	72		D	Y5
557 VORO	22	0201	0204	0210	N16	E70	.956	15198	27.3	9	-B		C	0204	36		D	Y5
558 PALE	22	0203	0205	0213	N17	W18	.498	15184	20.7	10	-N	3	C		61		F	Y5
GRP66559	22	0435+0	0435+0	0441	S35	W61	.886	15178	17.6	6	1N				90		D	
MANI	22	0435E	0435U	0441	S35	W61	.886	15178	17.6	6D	-F		V		50	1.0		
TACH	22	0435	0435	0444	S33	W60	.876	15178	17.7	9	1N		V	0435	133	3.3	D	
CULG	22	0435		0437	S37	W68	.929	15178	17.1	2	1N		P	0435	90	2.3		
GRP66560	22	0828	0837+0	0907	N23	E34	.704	15188	24.9	39	-F				100	1.4		
HTPR	22	0828	0837	0907	N23	E33	.695	15188	24.8	39	-F		C	0837	100	1.1	E	
MANI	22	0833E	0837	0904D	N23	E36	.722	15188	25.1	31D	-F		V		100	1.5	F	
561 KANZ	22	0945	0952	1001	S31	E18	.490	15202	23.8	16	-F							Y5
GRP66562	22	0949	0952	0958	S40	W36	.721	15201	19.7	9	-F							
KANZ	22	0949	0952	0956	S40	W37	.728	15201	19.6	7	-N							
HTPR	22	0950E		1000	S40	W36	.721	15201	19.7	10D	-F		C	0951	40	.5		
563 KANZ	22	1008	1018	1022	S31	E16	.474	15202	23.6	14	-F							Y5
GRP66564	22	1143+3	1154+4	1206	N36	E66	.967	15203	27.4	23	1N				120		D	
KANZ	22	1143	1158	1158D	N36	E66	.967	15203	27.4	15D	-B							
HTPR	22	1146	1154	1200	N36	E66	.967	15203	27.4	14	-N		C	1154	140	2.8		
LVOV	22	1150E	1155	1211	N37	E60	.946	15203	27.0	21D	1F		P	1155	100		DC	
565 RAMY	22	1246	1250	1259	S42	W40	.763	15201	19.5	13	-F	2	C		30		F	Y5
GRP66566	22	1300>9	1315+0 1320	1404	N20	W23	.577	15184	20.8	64	-N				160	1.9	U	
HTPR	22	1300	1315	1404	N19	W23	.566	15184	20.8	64	-N		C	1315	200	2.1	EF	
RAMY	22	1310	1315	1349	N20	W25	.595	15184	20.7	39	-B	3	C		118		U F	
RAMY	22	1310	1320	1349	N20	W25	.595	15184	20.7	39	-N	3	C		94		U F	
MCMA	22	1357E		1410	N22	W22	.590	15184	20.9	13D	-N		C	1358	30	.4	BD	
567 RAMY	22	1312	1320	1325	S42	W40	.763	15201	19.6	13	-F	3	C		19		F	Y5
568 HTPR	22	1343	1344	1346	N36	E65	.963	15203	27.4	3	-F		C	1344	10	.2		Y5
GRP66569	22	1357>9	1438	1443D	S41	W40	.757	15201	19.6	46	-F						E	
MCMA	22	1357E		1436D	S42	W41	.770	15201	19.5	39D	-N		C	1409	40	.6	E	
KANZ	22	1431	1438	1443D	S40	W40	.751	15201	19.6	12D	-F							
	22	1555	1556	NO FLARE PATROL														
	22	1645	2219	NO FLARE PATROL														
	22	2223	2228	NO FLARE PATROL														
	23	0855	0905	NO FLARE PATROL														
	23	0920	0930	NO FLARE PATROL														
	23	0935	1010	NO FLARE PATROL														
	23	1035	1045	NO FLARE PATROL														
	23	1100	1114	NO FLARE PATROL														
	23	1436	1440	NO FLARE PATROL														
570 MCMA	23	1454	1520	1610D	S42	W54	.857	15201	19.6	76D	-N		C	1520	40	.8	EK	Y5
GRP66571	23	1605+1	1607+1	1611	S32	W86	.992	15178	17.2	6	-F						D	
MCMA	23	1605	1608	1612	S32	W87	.994	15178	17.1	7	-N		C	1608			D	
HTPR	23	1606	1607	1610	S32	W86	.992	15178	17.2	4	-F		C	1607	10			
572 MCMA	23	1624	1629	1635	S33	W85	.990	15178	17.3	11	-F		C	1629			D	Y5

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OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE MAR	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP. DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.		
573 HCMA	23	1719	1723	1728	S25	E81	.981	15205	29.8	9	-N		C	1723			E	Y5
574 HCMA	23	2012	2014	2025D	S32	W87	.994	15178	17.3	13D	-F		C	2014			D	Y5
	24	1232	1257	NO FLARE PATROL														
	24	1500	1549	NO FLARE PATROL														
	24	1703	2140	NO FLARE PATROL														
575 VORO	24	2159	2200	2202	S40	W69	.937	15201	19.7	3	-B		C	2200	63		D	Y5
576 VORO	24	2214	2218	2221	N19	W58	.889	15184	20.6	7	-B		C	2218	81	1.7	D	Y5
577 VORO	24	2229	2232	2239	S40	W69	.937	15201	19.8	10	-B		C	2232	81		D	Y5
578 VORO	24	2233	2234	2237	N20	W60	.905	15184	20.4	4	-B		C	2234	72	1.7	D	Y5
579 VORO	24	2308	2309	2313	N21	W60	.907	15184	20.5	5	-B		C	2309	45	1.2	D	Y5
GRP66580	24	2314+5	2322+5	2341	N18	W59	.894	15184	20.5	27	1N				190	4.1	HJU	
MANI	24	2314E	2327	2344	N18	W59	.894	15184	20.5	30D	1N		P		190	3.8	FU	
VORO	24	2319	2322	2338	N19	W60	.903	15184	20.5	19	1N		C	2322	197	4.6	EHJ	
	25	0207	0218	NO FLARE PATROL														
	25	0231	0239	NO FLARE PATROL														
	25	0242	0243	NO FLARE PATROL														
	25	0244	0253	NO FLARE PATROL														
	25	0602	0627	NO FLARE PATROL														
	25	0633	0647	NO FLARE PATROL														
	25	0700	0707	NO FLARE PATROL														
	25	0714	0718	NO FLARE PATROL														
581 HTPR	25	1321	1323	1334	N38	E26	.777	15203	27.5	13	-F		C	1323	40	.5	E	Y5
582 HTPR	25	1538	1538	1543	N38	E25	.772	15203	27.5	5	-F		C	1538	10	.1		Y5
	25	1613	2147	NO FLARE PATROL														
	25	2148	2155	NO FLARE PATROL														
GRP66583	25	2302+3	2307+0	2317	N20	W77	.986	15184	20.2	15	-N						D	
CULG	25	2302	2307	2322	N20	W76	.983	15184	20.3	20	-F		C	2307	10			
VORO	25	2305	2307	2312	N21	W78	.989	15184	20.1	7	-B		C	2307	45		D	
GRP66584	25	2358>9	0010+4	0025	N22	W79	.991	15184	20.1	27	1F				90		H	
VORO	26	0012	0014	0019	N23	W85	.999	15184	19.6	7	1N		C	0014	108		H	
CULG	25	2358	2410U	0030	N21	W74	.977	15184	20.4	32	1F		C	2410	80			
585 CULG	26	0046	0058	0115	N20	W75	.980	15184	20.4	29	-N		C	0058	50			Y5
586 CULG	26	0601	0605	0611D	S32	W02	.426	15211	26.1	10D	-F		P	0605	50	.6	F	Y5
GRP66587	26	0820E	0822	0906D	N23	W48	.825	15187	22.7	46	-B							
MANI	26	0820E	0822	0906D	N25	W46	.818	15187	22.9	46D	-N		P		120	2.0	FE	
CATA	26	0835E	0835	0840D	N22	W50	.837	15187	22.6	5D	1B	2	P	0835	168	3.1		
	26	2107	2220	NO FLARE PATROL														
588 KANZ	27	0722	0725	0733	S29	W16	.452	15211	26.1	11	-N							Y5
589 KANZ	27	0850	0855	0913	S32	W14	.475	15211	26.3	23	-F							Y5
590 KHAR	27	1058E		1105D	S28	W19	.466	15211	26.0	7D	-F		P				HO	Y5
591 KANZ	27	1152	1159	1211	S29	W20	.487	15211	26.0	19	-F							Y5
GRP66592	27	1202+1	1204+3	1219	S25	E19	.434	15206	28.9	17	-F							
HTPR	27	1202	1204	1215	S26	E19	.445	15206	28.9	13	-F		C	1204	20	.2		
KANZ	27	1203	1207	1223	S25	E19	.434	15206	28.9	20	-F							
593 HTPR	27	1327	1329	1339	S30	W23	.526	15211	25.8	12	-F		C	1329	20	.2		Y5
GRP66594	27	1329	1332	1347	N15	W09	.400	15198	26.9	18	-N							
HTPR	27	1329	1332	1344	N15	W10	.406	15198	26.8	15	-N		C	1332	120	1.2		
KANZ	27	1333E	1333	1349	N16	W08	.409	15198	27.0	16D	-N							
	27	1556	2118	NO FLARE PATROL														
595 VORO	27	2337	2338	2340	S31	W28	.583	15211	25.9	3	-N		C	2338	116	1.4		Y5

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OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP. DAY	MIN.		CONC	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
	MAR																	
GRP66596	28	0030+7	0035+6	0052	N15	W15	.444	15198	26.9	22	-B		C		120	1.3	FU	
CULG	28	0030	0035	0053	N15	W15	.444	15198	26.9	23	-B		C	0035	100	1.1		
MANI	28	0037	0041	0050	N15	W16	.453	15198	26.8	13	-N		P		150	1.7		
PALE	28	0039E	0039U	0039D	N14	W10	.391	15198	27.3		-B	3	C		104		U F	
597 CULG	28	0250E	0254	0316D	S27	E11	.387	15205	28.9	26D	-B		C	0254	50	.6	C	Y5
598 CULG	28	0537	0552	0623	N35	W09	.677	15203	27.6	46	-N		C	0552	10	.1		Y5
GRP66599	28	0709+1	0713+1	0735	S27	E09	.374	15205	29.0	26	-N				40	.4	K	
HTPR	28	0709	0713	0734	S26	E08	.354	15205	28.9	25	-N		C	0713	40	.4	K	
MANI	28	0710	0714	0735	S28	E10	.395	15205	29.0	25	-F		P		40	.4		
CULG	28	0713E	0713E	0724D	S27	E08	.369	15205	28.9	11D	-N		P	0713	35	.4		
600 KANZ	28	0801E	0801	0807	S29	W32	.608	15211	25.9	6D	-F							Y5
601 HTPR	28	1352	1356	1358	S28	W35	.634	15211	26.0	6	-F		C	1356	10	.1		Y5
602 HTPR	28	1355	1357	1413	S26	E02	.331	15205	28.7	18	-F		C	1357	20	.2		Y5
	28	1708	1842	NO FLARE PATROL														
	28	1851	2109	NO FLARE PATROL														
603 RAMY	28	1950	1951	1958	S30	W35	.646	15211	26.2	8	-N	3	C		19			Y5
GRP66604	29	0828	0835+1	0903	S32	W44	.744	15211	26.1	35	-N						E	
KANZ	29	0828	0836	0906	S32	W44	.744	15211	26.1	38	-N						E	
CATA	29	0835E	0835	0900	S33	W45	.758	15211	26.0	25D	-N	2	P	0835	112	1.7		
605 KANZ	29	1114	1118	1129	S17	E74	.955	15216	4.0	15	-F							Y5
	29	1634	2220	NO FLARE PATROL														
	30	0056	0100	NO FLARE PATROL														
606 MCMA	30	1428E		1433D	N32	E80	.996	15220	5.6	5D	-N		P	1428			D	Y5
607 KANZ	30	1511	1521	1523	N31	E71	.976	15220	5.0	12	-F							Y5
608 KANZ	30	1539E		1557	S17	E56	.825	15216	3.9	18D	-F							Y5
	30	1804	2200	NO FLARE PATROL														
609 RAMY	30	2048	2051	2102	S26	W27	.533	15205	28.8	14	-B	3	C		184			Y5
610 VORO	30	2207	2208	2212	N37	W40	.843	15203	27.9	5	-B		C	2208	54	1.0	D	Y5
611 VORO	30	2308	2317	2325	N31	E72	.979	15220	5.4	17	-B		C	2317	45		EK	Y5
612 VORO	30	2321	2322	2327	N19	E59	.895	15214	4.4	6	-N		C	2322	54	1.0	D	Y5
613 VORO	30	2332	2334	2344	S29	W28	.568	15205	28.9	12	-N		C	2336	63	.8	DH	Y5
614 KANZ	31	1103	1106	1120	N39	W46	.886	15203	28.0	17	-F						G	Y5
	31	1323	1325	NO FLARE PATROL														
615 KANZ	31	1334	1340	1416	N38	W55	.926	15203	27.4	42	-F						G	Y5
	31	1648	1807	NO FLARE PATROL														
	31	2007	2030	NO FLARE PATROL														
	31	2045	2109	NO FLARE PATROL														
	31	2121	2200	NO FLARE PATROL														
616 VORO	31	2237	2238	2241	S18	E40	.651	15216	3.9	4	-N		C	2238	27	.4	D	Y5
617 VORO	31	2238	2239	2240	N39	W55	.929	15203	27.8	2	-N		C	2239	45	1.2	DG	Y5

"Remarks":

A = Eruptive prominence whose base is less than 90° from central meridian.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No visible spots in the neighborhood.
H = Flare accompanied by a high speed dark filament.
I = Active region very extended.
J = Distinct variations of plage intensity before or after the flare.
K = Several intensity maxima.
L = Existing filaments show signs of sudden activity.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the calcium II lines H and K.
P = Flare shows helium D_3 in emission.
Q = Flare shows the Balmer continuum in emission.
R = Marked asymmetry in Hα line suggests ejection of high velocity material.
S = Brightness follows disappearance of filament (same position).
T = Region active all day.
U = Two bright branches, parallel (||) or converging (Y).
V = Occurrence of an explosive phase: important and abrupt expansion in about a minute with or without important intensity increase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide Hα line.
Y = System of loop-type prominences.
Z = Major sunspot umbra covered by flare.

MARCH 1978

DAILY FLARE INDICES
Includes all Flares

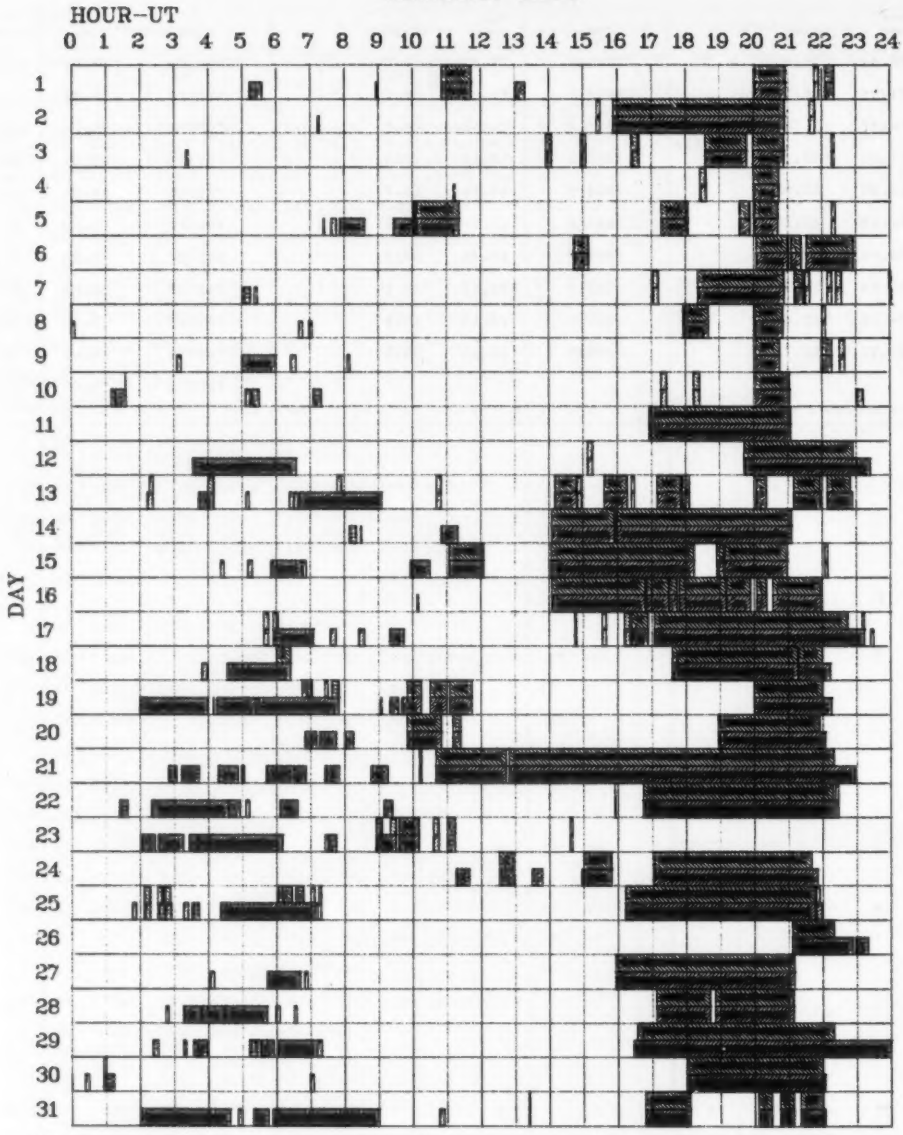
Date	Flare Index	HR. OBS.	Date	Flare Index	HR. OBS.	Date	Flare Index	HR. OBS.
780301	28.51	21.8	780311	77.83	19.9	780321	30.68	12.4
780302	63.33	18.7	780312	22.56	20.7	780322	65.02	18.3
780303	34.17	21.3	780313	34.46	19.3	780323	4.22	22.6
780304	57.21	23.1	780314	57.83	17.0	780324	28.78	18.2
780305	18.39	20.8	780315	47.86	16.7	780325	11.34	17.0
780306	462.18	20.9	780316	22.36	16.6	780326	8.39	22.8
780307	24.28	20.6	780317	15.75	17.2	780327	38.83	18.8
780308	35.68	22.3	780318	55.12	19.2	780328	35.69	20.1
780309	34.52	22.9	780319	28.11	19.8	780329	3.50	18.2
780310	122.82	22.7	780320	11.57	19.8	780330	16.47	20.0
						780331	4.95	21.2

When no Flare Index is given, it is 0 for that day.

INTERVALS OF NO FLARE PATROL OBSERVATION

FOR PRECEDING SOLAR FLARE TABLE

MARCH 1978



Observatories included in total patrol:

Abastumani	Herstmonceux	Kharkov	McMath-Hulbert	Tehran
Athenes	Huancayo	Kiev	Mitaka	Upice
Bucharest	Hurbanovo	Kodaikanal	Monte Mario	Voroshilov
Catania	Istanboul	Locarno	Palehua	Wendelstein
Culgoora	Kandilli	Lvov	Ramey	Zürich
Haute Provence	Kanzelhohe	Manila	Tashkent	

Times of no flare patrol are shown by the shaded area for each day divided into times of no cinematographic patrol (bottom half of day) and times of neither visual nor cinematographic patrol (top half of day).

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

MARCH 1978

MAR 1978	FREQUENCY	STATION	TYPE	STARTING TIME	TIME OF MAXIMUM	DURATION	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1}		INT	POLARIZATION OR REMARKS
				UT	UT	MINUTES	PEAK	MEAN		
1	221	ABST	44 NS	0500	0825.2	240	16			
	930	BORD	8 S	0824	0824	.1	46	1		
	260	ONDR	46 C	1008	1036.8	42	13	3.7		
	260	ONDR		1008	1015.7		12			
	930	BORD	41 F	1143	1143.1	.5	18	2		
	2650	DWIN	45 C	1416	1423	8	60	15		
	930	BORD	41 F	1535	1537.4	2.7	35	2		
	2800	OTTA	1 S	1555.2	1555.5	2	1.4	.7		
	2800	OTTA	23 GRF	1800	1930	240	4.6	2.3		
	2695	BOUL	23 GRF	1816.5	1819	13	5	2		
	1420	BOUL	8 S	1816.5	1817.5	3	12	4		
	606	SGMR	1 S	1816.8	1817.4	2.2	6.5	2.6		
	1415	SGMR	3 S	1816.8	1817.5	1.5	14	5.6		
	2695	SGMR	1 S	1817	1818.9	3.7	3.6	1.4		
	4995	SGMR	3 S	1817.2	1818.5	4.5	14.3	5.7		
	4995	BOUL	1 S	1817.5	1818	2	8	3		
	2800	OTTA	2 S/F	1817	1819	4	2.8	1.4		
	245	SGMR	6 S	1818.5	1818.6	1.5	11.6	4.6		
	410	SGMR	6 S	1818.7	1818.8	.5	22	8.8		
	4995	BOUL	1 S	1840.5	1841.5	2	8	3		
2	221	ABST	44 NS	0500	0731	240	31			
	260	ONDR	41 F	0835.6		117	8	2		
	260	ONDR	3 S	1228.7	1228.7	.2	18			
	536	ONDR	2 S/F	1228	1228.6	1.5	24			
	260	ONDR	1 S	1230.5	1230.5	.2	5			
	2800	OTTA	20 GRF	1625	1645	30	2.8	1.3		
	2800	OTTA	27 RF	1715		68	2.8	2		
	2800	OTTA	24 R	1715	1737	22	2.8	1.4		
	2800	OTTA	24P R	1737		31	2.8			
	606	SGMR	3 S	1805.9	1807.3	1.6	13.7	5.5		3,5
	245	SGMR	6 S	1807.6	1815.7	8.4	197	39.4		3,5
	1415	SGMR	1 S	1807.7	1808	.4	3.2	1.3		3,5
	410	SGMR	6 S	1807.8	1808.2	9.2	94.5	18.9		3,5
	2800	OTTA	26 FAL	1808	1823	15	-5	-3		
	9400	HUAN	21 GRF	1823.7	1856.3	36.3	11	6.7		0
	2800	OTTA	27A RF	1825		325	7.4	6.7		
	2800	OTTA	24 R	1825	1905	40	7.4	3.7		
	15400	SGMR	3 S	1826.4	1831	11	22.8	9.1		
	4995	SGMR	3 S	1828	1830.8	6.9	44.2	17.6		
	8800	SGMR	3 S	1828.2	1830.9	5.8	41.4	16.5		
	2695	SGMR	3 S	1828.3	1830.6	7.7	18.2	7.3		
	9400	HUAN	3 S	1828.8	1830.8	4.2	42.6	17.8		R
	2800	OTTA	3 S	1828	1830.5	7	14.8	7		
	4995	BOUL	3 S	1828	1830.5	6	38	13		
	2695	BOUL	3 S	1829.5	1831	5.5	13	4		
	2800	OTTA	24P R	1905		267	7.4			
	2800	OTTA	20 GRF	1907	1913	13	2.2	1.1		
	2800	OTTA	21 GRF	1938	1940	25	2.4			
	1420	BOUL	45 C	1944.5	1944.5	3	11	4		
	1415	SGMR	3 S	1944.5	1944.8	3.6	19.7	59.3		3G
	606	SGMR	3 S	1944.8	1947.4	4.4	90.1	18		3G
	2800	OTTA	8 S	1944.8	1945	.8	4.2			
	410	SGMR	6 S	1944.9	1945.2	4.7	146.5	29.3		3G
	245	SGMR	7 C	1944.9	1945.2	7.8	498.9	100		3G
	245	SGMR	6 S	1959.9	2015.4	18.9	185.6	37.1		
	410	SGMR	6 S	2008.7	2011.8	17.7	71.4	14.3		
	606	SGMR	3 S	2004.5	2015.4	11.1	44.5	8.9		
	2800	OTTA		2020		60	2.4			
	9400	HUAN	20 GRF	2053.5	2119.8	43.2	15.8	3.3		R
	500	HIRA	42 SER	2204	2204.3	4	500			0
	200	HIRA	42 SER	2204	2205	4	2500			0
	100	HIRA	42 SER	2204	2205.5	4	1500			0
	410	SGMR	6 S	2204	2204.5	4	126	25.2		
	245	SGMR	48 GB	2204	2204.5	4	2371	474.2		
	606	SGMR	3 S	2204.3	2204.4	3.8	150.5	30.1		
	2695	PENT	40 F	2204	2211	15	1.8			
	200	VORO	42 SER	2204	2204	24	450			
	200	VORO		2204	2216		460			
	200	VORO		2204	2224		53			
	200	VORO		2204	2227		360			
	100	HIRA	41 F	2215	2227.5	60	8000			0
	200	HIRA	41 F	2215.5	2215.8	60	3000			0
	245	SGMR	48 GB	2215.6	2215.9	14.4D	2080	416		
	410	SGMR	6 S	2215.8	2216	14.2D	38.5	7.7		
	606	SGMR	3 S	2227.6	2227.8	.4	162.5	32.5		
	200	VORO	42 SER	2301	2306	39	250			
	200	VORO		2301	2314		280			
	200	VORO		2301	2329		540			
	200	VORO		2301	2332		280			
	100	HIRA	46 C	2327.5	2328.5	5	15000	2000		0
	200	HIRA	46 C	2328	2329	5	6000	1500		0
	700	SYDN	4 S	2328	2329.3	3				
	500	HIRA	46 C	2328.3	2329.1	2	500	150		0

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

MARCH 1978

MAR 1978	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} MEAN	INT	POLARIZATION OR REMARKS
	1400	SYDN	4 S	2328.5	2329.1	1.5				
	2695	MANI	3 S	2328.5	2329.3	1.8	41.7	27.8		I
	1415	MANI	3 S	2328.8	2329.2	1.5	50.8	33.9		
	2695	PENT	3 S	2328.9	2329.2	2	36	9		
	1420	BOUL	8 S	2328	2329.5	4	42	14		
	606	MANI	3 S	2329	2329.2	1	110.4	73.6		
	2695	BOUL	8 S	2329.5	2330.5	1.5	34	11		
	2695	PENT	26 FAL	2332	2350	18	-7.4	-2		
3	500	HIRA	46 C	0220.9	0221.6	2	100	30		O
	200	HIRA	46 C	0221	0221.5	5	20000	1000		O
	100	HIRA	46 C	0221	0223	5	6000	3000		O
	2695	MANI	3 S	0236.7	0237.3	1.9	18.8	7.2		
	606	MANI	3 S	0236.7	0238.9	8.1	55.2	36.8		
	1415	MANI	3 S	0236.9	0237	.9	47	3.1		
	221	ABST	44 NS	0500	0930	240	21			
	3100	GRIM	1 S	0719	0720	3	2	1		
	29	UPIC	46 C	1136.5	1143.1	8.2				
	33	UPIC	46 C	1136.5	1138.5	8.2				
	9400	HUAN	20 GRF	1207.3	1258.6	82.7	17.2	6.3		R
	2695	SGMR	20 GRF	1228.5	1243	53	6.5	3.3		SWF
	4995	SGMR	20 GRF	1234.6	1305.2	46.4	11.2	5.6		SWF
	8800	SGMR	20 GRF	1238.3	1250.4	35.1	10.5	5.3		SWF
	2800	OTTA	1 S	1450	1452	4	2.8	1.2		
	2800	OTTA	21 GRF	1837	1940	170	7.6	3.8		
	2800	OTTA	20 GRF	1842	1846	30	4.8	2.4		
	4995	BOUL	8 S	2203	2203.5	1.5	10	3		
	2695	BOUL	8 S	2204	2204.5	1.5	6	2		
	2800	OTTA	1 S	2204	2204.1	2	6.4	2.2		
	2930	VORO	3 S	2325	2328	5	24			
4	221	ABST	44 NS	0500	1015	240	22			
	3100	GRIM	24 R	1032	1048		4			
	127	TORN	40 F	1157.4	1205.7	10.5	10			
	3000	BERL	20	1205	1259	111	7.9			
	1470	BERL	20	1210	1307.5	104	3.9			
	9500	BERL	20	1214	1307	121	21			
	9400	HUAN	20 GRF	1219	1326.8	115.8	20.6	11.1		R
	2800	OTTA	20 GRF	1230	1303	140 D	15.6			
	260	ONDR	8 S	1444	1444	.3	155			
	9400	HUAN	28 GRF	1634.8	1644.6	26.2	8.6	2		L
	2800	OTTA	20 GRF	1705	1717	30	2.2	1.1		
	2800	OTTA	21 GRF	1740	1752.5	93	6.4	3.2		
	1420	BOUL	3 S	1741	1746.5	14.5	6	2		
	4995	SGMR	1 S	1743.5	1747.6	9.7	7.3	2.2		
	2695	SGMR	1 S	1743.5	1745.6	10	8.4	2.5		
	2800	OTTA	1 S	1743	1747.5	7	5.6	2.8		
	1415	SGMR	1 S	1744.8	1747.7	8.2	5	1.5		
	2800	OTTA	21 GRF	1937	2000	73	2.8	1.4		
	2800	OTTA	1 S	2025	2030	10	1.4	.7		
5	221	ABST	44 NS	0500	1032	240	12			
	113	POTS	45 C	0645.5	0646.1	.4	100	20		
	260	ONDR	43 NS	0908		352 D	17			
	245	SGMR	43 NS	1430	1710.5	483 D	48.1			
	208	VORO	44 NS	2200 E	0111	360 D	19	8		
	2800	OTTA	20 GRF	1620	1710	120	2.8	1.4		
	2800	OTTA	20 GRF	1825	1831	35	4.2	2.1		
6	100	GORK	44 NS	0430 E		540		5		
	200	GORK	44 NS	0430 E		489		7		
	221	ABST	44 NS	0500	0616.8	240	21			
	202	IZMI	44 NS	0600		360	30			
	260	ONDR	44 NS	0745 E		388 D	40	7		
	127	TORN	43 NS	0900 U	1110.5	400 D	360			V=2
	245	SGMR	44 NS	1115 E	1343.6	688 D	244			2,3G,CONT
	410	SGMR	44 NS	1115 E	1239.3	688 D	356			2,3G,CONT
	606	SGMR	43 NS	1657.5	1926	337.5D	20			CONT
	100	HIRA	44 NS	2100 E	2125	705 D	690	110		SL
	200	HIRA	44 NS	2100 E	2250	705 D	140	30		ML
	208	VORO	44 NS	2200 E	0150	360 D	60	28		
	202	IZMI	41 F	0855.7	0933.3	47	310			
	234	POTS	2	0906.4	0909	2.6	120	1		
	228	HARS	45 C	0911.5	0913	3.5	200	50		
	3000	BERL	1 S	0944	0945.2	3	3.3			
	1470	BERL	1 S	0945.5	0946.5	2	2.3			
	33	UPIC	8 S	1051.1	1051.2	.4				
	29	UPIC	8 S	1051	1051.3	.5				
	33	UPIC	4 S/F	1103	1103.1	.4				
	29	UPIC	8 S	1103	1103.4	.9				
	3100	GRIM	47 GB	1119	1145.5	131 D	87			
	6100	KISV	21 GRF	1120	1216	121	42			
	888	ONDR	28 PRE	1124.5	1150	33	48	39		
	930	BORO	40 F	1124	1233.5	167	70	16		
	2650	OWIN	47 GB	1125	1204	120	100	50		

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

MARCH 1978

MAR 1978	FREQUENCY	STATION	TYPE		STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} MEAN	INT	POLARIZATION OR REMARKS
	1470	BERL	45		1125	1204.5	215	73			
	3000	BERL	45		1126	1204	209	48			
	10400	BERN	20	GRF	1127	1155.3	120	13	37		
	2950	GORK	23	GRF	1127.5	1141.5	110	55			
	950	GORK	23	GRF	1128		70	18			
	9500	BERL	20		1128	1216	210	39			
	9100	GORK	20	GRF	1129.2	1155.7	126	61.3	35.3		
	536	ONDR	28	PRE	1130	1215.5	51	36	20		
	2695	SGMR	20	GRF	1135	1204.5	82	79	47.4		2,CONT
	650	GORK	23	GRF	1136		90				
	4995	SGMR	20	GRF	1137	1155.5	43	27.3	16.4		2,CONT
	29	UPIC	28	PRE	1137.2	1142.1U	19				
	33	UPIC	28	PRE	1138.9	1148.3	17.5				
	1415	SGMR	20	GRF	1142.5	1204.5	63.5	39.7	23.8		2,CONT
	2950	GORK	3	SF	1150.4	1151	1.8	52			
	2950	GORK	4	SF	1153	1155	5.6	93			
	234	POTS	45	C	1153.5	1308 D	207 D	35			
	100	GORK	46	C	1155.8	1157.6U	6.3	120			
	100	GORK			1155.8	1207		24000			
	29	UPIC	49	GB	1156.2	1200.6	33.6				
	33	UPIC	49	GB	1156.4	1200.7	34.1				
	113	POTS	45	C	1156.5	1513 D	204 D	420			
	808	ONDR	49	GB	1159.5	1230.5	79	55	42		
	228	HARS	27	RF	1200	1212	15	50	25		
	268	ONDR	49	GB	1200	1311	132	57	16		
	2950	GORK	4	SF	1201.6	1204.2	6	80			
	606	SGMR	20	S	1201.8	1204.2	7.3	16.4	9.9		2,CONT
	950	GORK	3	S	1202.4	1206.6	6.3	22			
	2800	OTTA			1210	1232	280 D	45			
	9400	HUAN	26	FAL	1216.3	1216.8	48.2	50.7	33		R
	536	ONDR	49	GB	1221	1237.5	57	110	56		
	650	GORK	45	C	1224	1225.8	7.1	46	18		
	650	GORK			1224	1230.4		61			
	950	GORK	3	S	1225.4	1225.8	.7	13			
	950	GORK	3	S	1229	1230.5	2.4	11			
	606	SGMR	4	S/F	1301	1309.1	16	115	46		3G,CONT
	410	SGMR	6	S	1301.9	1307.3	16.2	89.7	35.9		3G,CONT
	1415	SGMR	3	S	1303	1317	18	50.8	20.3		3G,CONT
	650	GORK	45	C	1303	1304.1	15	19.5	16		
	650	GORK			1303	1309.2		43			
	808	ONDR	29	PBI	1318		42	30	13		
	536	ONDR	29	PBI	1318		42	20	9		
	2800	OTTA	22	GRF	2028	2043	40	5.6	1.4		
7	606	MANI	3	S	0246	0246.6	1.1	31.5	17.5		I
	200	GORK	44	NS	0439 E		309		12		
	100	GORK	44	NS	0439 E		309		5		
	202	IZMI	44	NS	0600		360	47			
	221	ABST	43	NS	0620	0713.2	60	10			
	260	ONDR	44	NS	0732 E		451 D	71	6		
	127	TORN	44	NS	0740 E	1309.6	480 D	100			V=0
	410	SGMR	44	NS	1114 E	1409.4	586 D	42.4			3G
	245	SGMR	44	NS	1114 E	1401.3	586 D	424			3G
	100	HIRA	44	NS	2100 E	0030	705 D	85	45		SL
	200	HIRA	44	NS	2100 E	0700	705 D	40	15		WL
	208	VORO	44	NS	2200 E		360 D		20		
	113	POTS	45	C	0621.5	0622.2	1.7	2800	450		
	234	POTS	45	C	0621.8	0622.3	.5	125	30		
	113	POTS	2		0717.7	0717.8	5.3	100	1		
	234	POTS	2		0718	0720.4	3	260	6		
	228	HARS	45	C	0720	0720.5	2	140	30		
	536	ONDR	4	S/F	0748.6	0750	2	37	2		
	234	POTS	48		1115.9	1117.3	8.5	200	2		
	234	POTS	48		1400.5	1404.4	9	160	1		
	113	POTS	48		1401.5	1408.1	8.5	175	2		
	127	TORN	45	C	1406.6	1408.3	4	140	45		
	2800	OTTA	240	R	1500	1507	7	3	1.5		
	930	BORD	8	S	1518.6	1518.6	.1	24	1		
	930	BORD	41	F	1613.3	1613.3	.4	103	2		
	4995	BCUL	3	S	1848	1849	2	10	3		
	2800	OTTA	20	GRF	2112	2116	30	2.2	1.1		
	2695	PENT	21	GRF	2318	2330	40	6.2	3.1		
	2695	PENT	1	S	2321	2324	8	7.6	2.8		
8	200	GORK	44	NS	0442 E		388		25		
	100	GORK	44	NS	0442 E		414		5		
	221	ABST	44	NS	0500	0712.5	240	28			
	202	IZMI	44	NS	0600		360	44			
	127	TORN	44	NS	0730 E	1132.5	490 D	95			V=1
	260	ONDR	44	NS	0742 E		440 D	57	5		
	410	SGMR	44	NS	1440 E	2204.9	477 D	30.8			
	245	SGMR	44	NS	1440 E	1513.3	477 D	94.2			
	100	HIRA	44	NS	2100 E	0118	705 D	60	20		WL
	200	HIRA	44	NS	2100 E	0630	705 D	40	10		WL
	208	VORO	44	NS	2200 E		360 D		12		

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MAR 1978	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	536	ONDR	42 SER	0742.3	0743.8	65	15	.9		
	221	ABST	45 C	0852.5	0857.8	5	41			
	536	ONDR	3 S	1020	1020	.3	32			
	536	ONDR	1 S	1023.2	1023.2	.2	15			
	127	TORN	45 C	1325	1325.5	1.4	830	280		UNCERTN
	2800	OTTA	22 GRF	1410	1416	70	2.8	1.6		
	2800	OTTA	240 R	1715	1835	80	4.2	2.1		
	4995	BOUL	8 S	1849	1850	1.5	13	4		
	2800	OTTA	1 S	1853	1854	3	1.4	.7		
	2800	OTTA	1 S	2103.5	2104.5	2	1.4	.7		
	2800	OTTA	20 GRF	2134	2136	14	2.8	1.8		
	606	SGMR	3 S	2135.3	2135.4	.3	35	14		
	2800	OTTA	8 S	2204.7	2204.8	.2	2.8			
	2695	PENT	21 GRF	2300	2325	105	6	3		
	2930	VORO	3 S	2320	2325	10	19			
	2695	PENT	1 S	2331.5	2332.1	2	4.6	2		
	2695	PENT	1 S	2358.5	2359	1	1.4	.7		
9	108	HIRA	7 C	0456.5	0456.8	1	12000	4000		WL
	280	GORK	44 NS	0500 E		465		5		
	108	GORK	44 NS	0500 E		380		10		
	221	ABST	44 NS	0508	0714	240	27			
	202	IZMI	44 NS	0608		210	47			
	127	TORN	44 NS	0650 E	1145 U	530 D	16 U			V=1
	260	ONDR	44 NS	0730 E		452 D	81	5		
	245	SGMR	44 NS	1110 E	1231.3	688 D	107			3.5
	410	SGMR	44 NS	1110 E	2028.1	688 D	64			3.5
	208	VORO	44 NS	2200 E		360 D		13		
	650	GORK	40 F	0618.4	0621.3	3	6.3			
	6100	KISV	2 S/F	0619	0621	3	78			
	4995	HANI	3 S	0619.8	0620.6	2.2	13.5	10.1		
	1415	HANI	3 S	0619.8	0620.5	2.3	17.3	10.6		
	3100	CRIM	1 S	0620	0621.5	4	10	3		
	606	HANI	1 S	0620.2	0620.5	.6	3.3	1.6		
	950	GORK	2 SF	0620.7	0621.4	3.9	10.8			
	9100	GORK	2 SF	0620.8	0621.4	2.4	28.3	14		
	5730	IRKU	2 S	0620	0620.9	4	20	6		
	2950	GORK	1 S	0621.2	0621.5	1.6	12			
	33	UPIC	45 C	0808.5	0810.7	4.8				
	29	UPIC	45 C	0808.8	0811.4	5				
	650	GORK	1 S	0809	0810.8	3	4.5	2		
	950	GORK	1 S	0810.4	0810.8	1	11	5.5		
	100	GORK	8 S	0810.5	0810.9U	1.2	100			
	930	BORD	46 C	0810.5	0810.9	1.5	33	2		
	3000	BERL	1 S	0810.5	0810.7	.5	1.9			
	1470	BERL	1 S	0810.5	0810.6	1	5.2			
	202	IZMI	5 S	0810.5	0810.5	.7	670	270		
	113	POTS	48	0810.6	0831.8	22	2000	1		
	2950	GORK	1 S	0810.6	0810.7	.7	8			
	234	POTS	48	0810.7	0810.7	21	230	1		
	3100	CRIM	29 PBI	0824	0834	36	5			
	3100	CRIM	1 S	0824	0831	10	12	4		
	260	ONDR	46 C	0824.4	0827.7	7.5	128	44		
	2950	GORK	20 GRF	0824.7	0828.6	9.8	9.6			
	202	IZMI	41 F	0825	0827	7.5	220			
	950	GORK	21 GRF	0825.5	0827.4	9.5	63			
	100	GORK	41 F	0825.5	0827.1	7.4	100			
	100	GORK		0825.5	0831.9		100			
	930	BORD	40 F	0825	0827.4	10	36	6		
	228	HARS	41 C	0826 D	0827	7 U	220	40 U		
	29	UPIC	46 C	0827.1	0830.9	7.9				
	33	UPIC	46 C	0827	0830.5	8.2				
	650	GORK	2 SF	0829.5	0831	5	9	3		
	808	ONDR	2 S/F	0830	0831.7	5.5	30	8.6		
	950	GORK	1 S	0831.3	0831.9	1.1	17.3			
	658	GORK	2 SF	0843	0845	2.7	5	2.5		
	33	UPIC	45 C	0905.7	0906.8	2.4				
	29	UPIC	45 C	0906.7	0907.2	2				
	3100	CRIM	20 GRF	0911	0952	77	5	2		
	33	UPIC	3 S	0926.1	0926.2	.3				
	29	UPIC	3 S	0926.2	0926.3	.3				
	9100	GORK	1 S	0952.6	0953.1	1.1	6	3		
	33	UPIC	3 S	0958.5	0958.6	.3				
	29	UPIC	3 S	0958.5	0958.6	.3				
	33	UPIC	42 SER	1005.6	1007.6	4.4				
	29	UPIC	42 SER	1005.7	1007.9	4.6				
	930	BORD	42 SER	1019.2	1023	3.8	42	2		
	33	UPIC	45 C	1133.7	1133.9	2.1				
	29	UPIC	45 C	1133	1134.4	3.4				
	930	BORD	41 F	1539	1540	1	33	2		
	4995	BOUL	47 GB	1838	1841	21	416	139		
	8800	SGMR	47 GB	1839.6	1840.7	31.2	800	240		SWF
	2695	SGMR	3 S	1839.6	1841.2	48.1	468	140		SWF
	9400	HUAN	3 S	1839.6	1840.8	2	626.4	230.1		L
	4995	SGMR	47 GB	1839.7	1840.6	34.8	662	199		SWF

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	2695	PENT	3 S	1839.8	1841	10.2	440	108		
	606	SGMR	3 S	1839.9	1840.6	29.3	452	136		SWF
	1415	SGMR	47 GB	1840.1	1840.8	31.2	1050	315		SWF
	35000	SGMR	47 GB	1840.1	1840.6	.9	800	240		SWF
	15400	SGMR	47 GB	1840.3	1840.8	15.9	580	174		SWF
	245	SGMR	7 S	1840.3	1841.1	21.2	449	135		SWF
	1420	BOUL	49 GB	1840	1840.5	18.5	625	208		
	9400	HUAN	29 PBI	1841.6	1841.6	15.1	87	47.3		L
	2695	BOUL	49 GB	1841	1842	11	473	164		
	2800	OTTA	29 PBI	1900	1900	55	22	4		
	2695	PENT	22 GRF	2005	2025	42	5.4	2.4		
	2800	OTTA	21 GRF	2053	2120	57	4.8	2.4		
	2800	OTTA	1 S	2113	2114.2	3	4.6	2.3		
10	700	SYDN	4 S	0048.5	0050	2.5				
	606	MANI	3 S	0048.7	0050.1	3.1	91.6	61.1		
	2695	MANI	3 S	0103.9	0105.4	3.6	21.7	14.5		
	2930	VORO	45 C	0103	0105	7	38			
	1400	SYDN	4 S	0104	0105.2	3				
	4995	MANI	3 S	0104.5	0105.2	3.2	91.8	54.6		I
	1415	MANI	3 S	0104.5	0105	2.7	33.6	22.4		
	2695	PENT	4 S/F	0104.7	0105.5	2	18.2			
	700	SYDN	4 S	0105	0106.7	5				
	208	VORO	48 C	0105	0106.5	4	350 D			
	100	HIRA	7 C	0106	0106.5	1.5	4000	1000		O
	200	HIRA	7 C	0106	0106.5	2	4000	1000		WL
	606	MANI	3 S	0217.7	0218.9	3.1	92	55.2		
	200	GORK	44 NS	0430 E		510		5		
	100	GORK	44 NS	0436 E		500		10		
	127	TORN	44 NS	0650 E	1485.8	530 D	430			V=1
	536	ONDR	44 NS	0740 E		447 D	145	11		
	245	SGMR	44 NS	1108 E	1619	691 D	77.7			3G
	410	SGMR	44 NS	1108 E	1329.1	691 D	42.8			3G
	208	VORO	44 NS	2200 E	0305	360 D	27	15		
	536	ONDR	45 C	0708.5	0708.5	1.5	45	4		
	3100	CRIM	1 S	0747	0749	4	3	1		
	113	POTS	45 C	0828.5	0829.6	2	600	150		
	228	HARS	40 F	0828.5	0829	1.5	90	25		
	234	POTS	45 C	0829	0829.3	1.1	175	60		
	202	IZMI	5 S	0829	0829	1	680	250		
	228	HARS	40 F	0831.5	0832	1	85	20		
	228	HARS	40 F	1025	1025.5	1.5	90	20		
	200	GORK	27 RF	1039	1123	86	25			
	3100	CRIM	1 S	1053	1056	11	7	2		
	9100	GORK	1 S	1054	1055	47	78	3.5		
	536	ONDR	45 C	1056.8	1056.8	3.5	124	12		
	202	IZMI	41 F	1109.7	1110.7	3.8	90			
	113	POTS	2	1207.7	1208.6	1.2	600	100		
	228	HARS	S	1348.5	1349	1.5	250	70		
	2800	OTTA	1 S	1440	1441	3.5	3	2.2		
	2800	OTTA	8 S	1501	1501.2	.5	1.2	.6		
	2695	PENT	20 GRF	1910	1925	25	2.4	1.2		
	4995	BOUL	45 C	1938.5	1940	15	26	9		
11	200	HIRA	27 RF	0200	0320	180	25	10		O
	100	HIRA	27 RF	0210	0310	180	45	20		O
	100	GORK	44 NS	0436 E		414		5		
	200	GORK	44 NS	0439 E		435		10		
	127	TORN	44 NS	0650 E	1020.2	530 D	43			V=0
	260	ONDR	44 NS	0725 E		467 D	54	5		
	245	SGMR	44 NS	1107 E	1637.1	694 D	50.7			3,CONT
	410	SGMR	44 NS	1107 E	1520.4	694 D	37.4			3,CONT
	208	VORO	44 NS	2200 E	0155	360 D	30	16		
	536	ONDR	8 S	1025.2	1025.2	.3	38			
	113	POTS	45 C	1206.8	1206.8	.1	100	30		
	536	ONDR	3 S	1212	1212	.3	20			
	536	ONDR	3 S	1341.8	1341.8	.3	20			
	2800	OTTA	20 GRF	1803	1810	40	2.4	1.2		
	2800	OTTA	22 GRF	1902	1916	45	5	2.2		
	2800	OTTA	20 GRF	2100	2135	60	2.4	1.2		
	2695	PENT	1 S	2352	2356	8	5.2	3		
12	200	HIRA	27 RF	0125	0153	80	30	5		MR
	100	HIRA	27 RF	0143	0153	35	50	15		SR
	200	GORK	44 NS	0415 E		435		10		
	100	GORK	43 NS	0425		420		5		
	127	TORN	44 NS	0650 E	1051.2	530 D	29			V=0
	260	ONDR	44 NS	0710 E		470 D	34			
	245	SGMR	44 NS	1105 E	1530.6	697 D	135.8			3G,S
	410	SGMR	44 NS	1105 E	1954.5	697 D	112			3G,S
	208	VORO	44 NS	2200 E		360 D		10		
	8800	SGMR	3 S	1415.5	1422.1	8	14.6	5.8		
	4995	SGMR	3 S	1417.6	1422.2	6.2	14.8	5.9		
	2695	SGMR	3 S	1417.9	1422.3	6.1	10.5	4.2		
	10400	BERN	3 S	1421.6	1422.1	.6	6	17		

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	2800	OTTA	1 S	1422.2	1422.5	1	5.8	2.9		
	2800	OTTA	29 PBI	1423.2	1423.2	8.8	1.8	1.6		
	4995	BOUL	3 S	1806	1808.5	5	13	4		
	9400	HUAN	21 GRF	1815.3	1821.3	16.3	9.3	6.1		R
	9400	HUAN	3 S	1817.4	1818.7	3.6	20.5	8.9		R
	2800	OTTA	1A S	1817	1819	6	3.6	1.6		
	2800	OTTA	8 S	1818.5	1818.5	.1E	33			
	2800	OTTA	20 GRF	2107	2109.5	20	3.8	1.6		
13	200	HIRA	27 RF	0400	0530	285 D	70	30		HR
	108	HIRA	27 RF	0450	0550	160	400	120		SR
	200	GORK	44 NS	0500 E		480		10		
	100	GORK	44 NS	0500 E		270		300		
	127	TORN	44 NS	0640 E	1116.6	540 D	100			V=1
	260	ONDR	44 NS	0730 E		454 D	54	4		
	100	GORK	43 NS	1010.7		170		5		
	410	SGHR	44 NS	1103 E	1900.2	700 D	30.8			3G
	245	SGHR	44 NS	1103 E	2220.2	780 D	105.3			3G
	200	HIRA	44 NS	2050 E	2240	720 D	40	10		SR
	208	VORO	44 NS	2200 E	2232	360 D	35	14		
	606	MANI	3 S	0601.9	0602.4	.9	76.3	49.8		
	1415	MANI	1 S	0602.2	0602.4	.5	3	2		
	9100	GORK	20 GRF	0621	0629	19.2	14.7	7		
	9500	BERL	1 S	1017	1017.5	2	4.2			
	1470	BERL	1 S	1017	1017.5	1	3.2			
	3000	BERL	1 S	1017	1017.5	1	1.1			
	100	GORK	3 S	1036.6	1037 U	1.1	140			
	202	IZMI	41 F	1036.7	1040.7	4.3	200			
	113	POTS	45 C	1037	1037.3	.3	6000	1000		
	3100	CRIM	20 GRF	1045	1048.5	32	4	1		
	100	GORK	46 C	1051.7	1052.5	1.3	140			
	100	GORK	46 C	1149.7	1150.6	2.4	140			
	100	GORK	46 C	1210.5	1211	1.1	140			
	113	POTS	2	1247.6	1247.6	.8	200	4		
	9400	HUAN	20 GRF	1350.8	1428.8	61.7	9.9	2.3		0
	2800	OTTA		1355	1402	95	7.4			
	1470	BERL	20	1401	1405.2	14	2.6			
	3000	BERL	22	1401	1405.6	14	11			
	2800	OTTA	20 GRF	1723	1726	17	4.6	2.2		
	2800	OTTA	1A S	1905.5	1911	18	2.6	1.3		
	2800	OTTA	1 S	1906.5	1907	1.5	3	1.5		
	2800	OTTA	32A ABS	1920	1955	78	-3.8	-1.9		
	2800	OTTA	1 S	1955.5	1957	4	3	1.5		
	2695	PENT	21 GRF	2325	2335	30	6	3		
	700	SYDN	GRF	2328	2331.8	5.8				
	1400	SYDN	4 S	2328.5	2330.8	6				
	2695	PENT	40 F	2330	2333	3	26			
14	2930	VORO	32 ABS	0005	0012	15	18 E			
	2930	VORO	45 C	0325	0345	15	15			
	100	HIRA	46 C	0338.5	0340	4	400	150		0
	208	VORO	48 C	0338	0342	7	190			
	200	HIRA	46 C	0339	0340	4	400	200		0
	5730	IRKU	45 C	0339.2	0341.2	17	14	4		
	5730	IRKU		0339.2	0344.6		9			
	2695	MANI	3 S	0339.8	0341.3	3.7	17.4	10.4		
	1415	MANI	3 S	0339.8	0341.5	5.2	7.2	4.8		I
	4995	MANI	3 S	0339.8	0344.6	6.2	15.4	9.2		
	200	GORK	44 NS	0427 E		513		10		
	100	GORK	44 NS	0500 E		420		20		
	127	TORN	44 NS	0640 E	0931.9	500 D	45			V=1
	260	ONDR	44 NS	0714 E		472 D	30	2		
	410	SGHR	44 NS	1102 E	1508.2	702 D	21.5			3,5
	245	SGHR	44 NS	1102 E	1851.8	702 D	144.9			3,5
	200	HIRA	44 NS	2050 E	0450	550 D	40	10		SR
	208	VORO	44 NS	2200 E		360 D		13		
	606	MANI	3 S	0627.7	0628.4	1	54.7	33		
	113	POTS	48	0813	0813.8	10	200	1		
	3100	CRIM	21 GRF	0828	0933	262	8			
	4995	SGHR	20 GRF	1207.8	1212.4	13.6	14.3	4.3		
	2695	SGHR	20 GRF	1207.9	1211.6	13	7.9	2.4		
	1415	SGHR	20 GRF	1208.1	1213.1	10.2	7.7	2.3		
	8800	SGHR	20 GRF	1208.7	1212.8	13.1	20.9	6.3		
	15400	SGHR	20 GRF	1208.9	1213.9	12	18	6		
	9400	HUAN	21 GRF	1210	1217	70	9.9	4.1		R
	9500	BERL	4	1211.4	1211.7	3.6	14			
	3000	BERL	1 S	1211.5	1212.5	3.5	5.2			
	3100	CRIM	1 S	1211.5	1213	2	8	3		
	8900	BERN	4 S/F	1211.6	1212.6	10	9	25		
	8400	BERN	4 S/F	1211.6	1212.6	10	7	20		
	10400	BERN	4 S/F	1211.6	1212.6	10	5	14		
	9400	HUAN	3 S	1211.7	1212.3	2.8	16.5	7.4		R
	9100	GORK	1 S	1211.9	1212.3	4.1	18	9		
	1470	BERL	1 S	1212	1212.5	5	5.4			
15	1400	SYDN	1 S	0003.5	0004	1				

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	208	VORO	48 C	0145.5	0148	3.5	200			
	2930	VORO	3 S	0225	0230	8	22			
	208	VORO	48 C	0232	0234	3.5	200			
	700	SYDN	4 S	0331.5	0332.5	2				
	1400	SYDN	1 S	0437	0438.5	2.5				
	700	SYDN	2 S	0439.5	0440.5	1.5				
	221	ABST	44 NS	0520	0815.2	200	21			
	260	ONDR	44 NS	0722 E		465 D	168	17		
	127	TORN	43 NS	0900 U	1336.8	360 D	170			V=1
	245	SGMR	44 NS	1100 E	1117.8	705 D	453.7			SWF
	410	SGMR	44 NS	1100 E	1703.7	705 D	27.2			5,CONT.
	234	POTS	1 S	0914.6	0914.7	.1	120	40		
	234	POTS	45 C	0935.8	0935.8	.5	315	60		
	3000	BERL		1005	1015.5					
	3100	CRIM	20 GRF	1005	1016	16	12	4		
	1470	BERL	20	1005	1016	19	3.9			
	9500	BERL	20	1005	1016	15	7.1			
	9100	GORK	20 GRF	1010.2	1015.9	23.1	12.3	4.3		
	808	ONDR	3 S	1014.4	1014.4	.2	45			
	202	IZMI	25 R	1025	1123.3	95 D	550	150		
	127	TORN	27 RF	1035 U	1240 U	240 U	170			
	113	POTS	45 C	1040	1243	260 D	150			
	234	POTS	45 C	1050	1235	250 D	60			
	33	UPIC	3 S	1120.1	1120.2	.3				
	29	UPIC	3 S	1120	1120.2	.4				
	29	UPIC	41 F	1132.3	1242.1	77.7				
	33	UPIC	41 F	1132.6	1210.7	78.3				
	3000	BERL	20	1240	1242.5	8				
	1470	BERL	20	1240	1241.5	4	2.2			
	2800	OTTA	22 GRF	1240	1255	45	3	2		
	9400	HUAN	20 GRF	1241.3	1259.7	42.5	8	2.7		0
	2800	OTTA	20 GRF	1520	1525	25	2.2	1.1		
	1415	SGMR	3 S	1701.9	1702.3	2.8	10.2	4.1		5
	606	SGMR	3 S	1702	1702.5	2.3	12.9	5.2		5
	245	SGMR	6 S	1702.6	1703	1.9	36.3	14.5		5
	4995	SGMR	1 S	1702.7	1703.3	2.1	3.7	1.5		5
	410	SGMR	6 S	1702.8	1703.2	1.1	26	10.4		5
	2695	SGMR	3 S	1702.8	1703.3	1.9	15.1	6		5
	2800	OTTA	3 S	1702.9	1703.2	2	14	4		
	2695	PENT	20 GRF	2325	2355	80 D	4.6			
	500	HIRA	24 R	2328	0335	560 D	60	30		SR
	100	HIRA	27 RF	2330	0245	360	500	120		SR
	200	HIRA	43 NS	2330	0330	600 D	200	50		SR
	208	VORO	43 NS	2336	0358	264 D	153	50		
	700	SYDN	40 F	2347.5	2355.5	12.5				
16	2930	VORO	23 GRF	0125	0143	35	18			
	2930	VORO	3 S	0305	0317	15	28			
	200	GORK	44 NS	0418 E		462		30		
	221	ABST	44 NS	0500	1030.2	240	20			
	100	GORK	43 NS	0543		378		10		
	202	IZMI	44 NS	0600		360	80			
	127	TORN	44 NS	0640 E	1020.1	500 D	110			V=2
	260	ONDR	44 NS	0726 E		459 D	116			
	410	SGMR	44 NS	1058 E	1409.5	709 D	60.2			3G
	245	SGMR	44 NS	1058 E	1413.6	709 D	180			3G
	200	HIRA	44 NS	2050 E	0350	280 D	50	10		SR
	208	VORO	44 NS	2200 E		240 D		12		
	113	POTS	45 C	0700.4	0701.3	2.2	200	20		
	234	POTS	45 C	1005.3	1005.8	.6	350	20		
	9400	HUAN	20 GRF	1530.2	1540.5	59.3	4.7	.5		R
	2800	OTTA	22 GRF	1820	1835	60	5.4	2.5		
	2930	VORO	21 GRF	2300	2328	33	15			
17	200	GORK	44 NS	0418 E		522		10		
	221	ABST	44 NS	0530	0858.2	240	15			
	202	IZMI	44 NS	0600		85	60			
	127	TORN	44 NS	0640 E	1218.3	500 D	28			V=0
	260	ONDR	44 NS	0710 E		477 D	49	4		
	410	SGMR	44 NS	1140 E	1758.6	668 D	17.6			3,SWF
	245	SGMR	44 NS	1140 E	1218.5	668 D	79.6			3,SWF
	208	VORO	44 NS	2200 E		240 D		20		
	234	POTS	45 C	0629	0629.3	.8	125	6		
	3100	CRIM	24 R	0854	0900		6			
	1470	BERL	1 S	0926.5	0927.3	2.1	2.1			
	33	UPIC	45 C	1054.7	1054.8	1.5				
	29	UPIC	45 C	1055.5	1055.6	1				
	2800	OTTA	22 GRF	1545	1600	35	2.4	1.2		
	100	HIRA	27 RF	2345	0120	345	800	200		SR
18	200	HIRA	27 RF	0000	0118	330	300	40		HR
	208	VORO	24 R	0017	0111	103 D	100	45		
	100	GORK	44 NS	0409 E		411		10		
	200	GORK	44 NS	0409 E		411		5		
	127	TORN	44 NS	0630 E	1049.2	510 D	350			V=1

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

MARCH 1978

MAR 1978	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	221	ABST	44 NS	0700	0809.8	120	10			
	260	ONDR	44 NS	0802 E		358 D	71	8		
	245	SGMR	44 NS	1055 E	1838	714 D	191			3G
	410	SGMR	44 NS	1055 E	1753.4	714 D	64.7			3G
	208	VORO	44 NS	2200 E		50 D		13		
	234	POTS	2	0657.6	0658.8	2.8	100	2		
	33	UPIC	42 SER	0754.3	0757.9	9.7				
	29	UPIC	42 SER	0754.3	0758	10				
	113	POTS	2	0756.2	0758.2	2.4	385	7		
	33	UPIC	45 C	0903.9	0904.3	1				
	29	UPIC	45 C	0904	0904.9	1.5				
	33	UPIC	45 C	0921.6	0921.7	1.6				
	29	UPIC	45 C	0921.6	0921.9	1.8				
	33	UPIC	46 C	1057	1059	6.1				
	29	UPIC	46 C	1058.2	1059.2	5.2				
	2800	OTTA	22 GRF	1425	1436	38	3.8	1.9		
	4995	BOUL	1 S	1815	1816.5	2	11	4		
	2695	BOUL	1 S	1816	1818	1.5	3	1		
19	208	GORK	44 NS	0409 E		410		5		
	108	GORK	43 NS	0433		96		10		
	221	ABST	43 NS	0700	0725.8	65	14			
	260	ONDR	44 NS	0744 E		387 D	94	6		
	410	SGMR	44 NS	1053 E	1304.1	717 D	62.3			
	245	SGMR	44 NS	1053 E	1431.2	717 D	325.6			
	127	TORN	48 F	0952.5	1017.7	35	6.5			
	2800	OTTA	20 GRF	1500	1505	25	1.6	.8		
	2800	OTTA	1 S	1953	1955	4	1	.5		
	2800	OTTA	20 GRF	2100	2105	30	1.6	.8		
20	2930	VORO	45 C	0005	0010	10	102			
	108	MIRA	41 F	0658	0718	17	280			0
	200	MIRA	41 F	0658	0710	13	150			0
	202	IZMI	41 F	0702 U	0710	9	125			
	260	ONDR	44 NS	0705 E		481 D	67	4.5		
	410	SGMR	44 NS	1051 E	1310.1	720 D	33.9			3
	245	SGMR	44 NS	1051 E	2147.3	720 D	52.4			3
	234	POTS	2	0709.6	0709.8	1.4	200	3		
	33	UPIC	45 C	0710.2	0710.6	1.6				
	29	UPIC	45 C	0710.4	0710.6	.9				
	2695	BOUL	3 S	2320.5	2321.5	2.5	3	1		
	2695	PENT	1 S	2320.5	2320.6	2	1.8	.9		
	1420	BOUL	8 S	2320	2320	2	3	1		
21	260	ONDR	44 NS	0718 E		469 D	27	3.5		
	410	SGMR	44 NS	1049 E	1706	723 D	8.4			3G
	245	SGMR	44 NS	1049 E	1513.3	723 D	49			3G
	33	UPIC	4 S/F	0800	0800.2	1.7				
	29	UPIC	2 S/F	0800	0800.2	1				
	3100	GRIM	1 S	0951	0951.5	1.5	5	2		
	3000	BERL	4	0951.5	0952.9	2.1	4.8			
	6100	KISV	3 S	0952	0952.6	2	3			
	1470	BERL	1 S	0952.3	0952.9	1.7	1			
	536	ONDR	8 S	0952.7	0952.7	.3	23			
	2800	OTTA	1 S	1834.5	1836.6	3.5	2.2	1.1		
	2800	OTTA	20 GRF	2158	2201	20	2.4	1.2		
22	2695	MANI	1 S	0420.6	0421	.9	7.4	3.7		
	1415	MANI	1 S	0420.6	0421	.8	1.6	.8		
	260	ONDR	44 NS	0711 E		476 D	23			
	221	ABST	44 NS	0945	1028	80	12			
	245	SGMR	44 NS	1048 E	2029	726 D	70.8			3G
	536	ONDR	2 S/F	0830.8	0832	3.5	8	2.4		
	260	ONDR	4 S/F	0830	0832	3	39	7.8		
	33	UPIC	45 C	0831	0833.3	3.7				
	808	ONDR	2 S/F	0832.4	0833.4	2	12	3		
	29	UPIC	45 C	0832.5	0833.1	2.1				
	6100	KISV	2 S/F	1145	1142	4	4			
	6100	KISV	45 C	1153	1154.5	11	11			
	9500	BERL	20	1308	1320.5	35	5.7			
	2800	OTTA	24 R	1300	1313	13	1.6	.6		
	2800	OTTA	27F RF	1300		55	1.6	1.2		
	1470	BERL	20	1308.5	1337	52	2.5			
	3000	BERL	20	1309.5	1338.5	51	4.5			
	2800	OTTA	24P R	1313		34	1.6			
	2800	OTTA	26 FAL	1347	1355	8	-1.6	-0.7		
	2800	OTTA	20 GRF	1422		70 D	2			
	2800	OTTA	20 GRF	1810	1915	80	1.6	.8		
	2695	PENT	24 R	2235	2250	15	2	1		
	2695	PENT	27 RF	2235		105	2	1.6		
	2695	PENT	24P R	2250		64	2			
	2695	PENT	26 FAL	2354	2420	26	-2	-1		
23	2930	VORO	42 SER	0110	0155	65	86			
	221	ABST	44 NS	0500	0525.8	240	9			

SOLAR RADIO EMISSION
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MARCH 1978

MAR 1978	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	260	ONDR	44 NS	0704 E		476 D	13			
	127	TORN	44 NS	0930 E	1146.1	330 D	11			V=0
	245	SGMR	44 NS	1046 E	1828.4	729 D	20.9			
24	606	MANI	3 S	0605.8	0606	.5	65.7	32.8		
	1415	MANI	1 S	0605.8	0606	.4	2.8	2		
	3100	CRIM	5 S	0657	0701	16	3	1		
	260	ONDR	44 NS	0722 E		465 D	11			
	127	TORN	44 NS	0800 E	1243.4	380 D	34			V=1
	245	SGMR	44 NS	1044 E	1628.6	732 D	20.4			
	930	BORD	41 F	0723	0723.4	1	31	2		
	930	BORD	8 S	0727.7	0727.7	.1	14	1		
	1415	MANI	1 S	0823.9	0824.1	1	1.4	.7		
	2695	MANI	1 S	0824.2	0824.8	1.4	5.5	2.7		
	930	BORD	8 S	1049.2	1049.2	.1	18	1		
	245	SGMR	6 S	1134.2	1135.5	3.3	57.4	23		
	9500	BERL	4	1211	1211.8	1.6	13			
	3000	BERL	2	1212.6	1213.3	1.1	1.7			
	2800	OTTA	20 GRF	1330		60	2.4	1.2		
	2800	OTTA	240AR	1500	1520	20	2.4	1.2		
	2800	OTTA	1 S	1518.2	1518.9	1	2.2	1.1		
	2800	OTTA	24 R	1710	1730	20	2	1		
	2800	OTTA	27 RF	1710		105	2	1.6		
	2800	OTTA	24P R	1730		66	2			
	2800	OTTA	26 FAL	1836	1855	19	-2	-1		
	35000	NAGO	22 GRF	2307	2315	15	4			
	2695	PENT	20 GRF	2310	2320	90	4.6	2.8		
	2930	VORO	42 SER	2320	2330	52	278			
25	260	ONDR	44 NS	0710 E		470 D	9			
	127	TORN	44 NS	0800 E	1033.6	380 D	13			V=0
	410	SGMR	44 NS	1042 E	1320.5	735 D	13.8			
	245	SGMR	44 NS	1042 E	1457.6	735 D	25.5			
26	1415	MANI	3 S	0804.5	0805.8	6.3	82.3	54.8		
	221	ABST	44 NS	0500	0541.2	240	8			
	260	ONDR	44 NS	0705 E		473 D	5			
	245	SGMR	44 NS	1041 E	1525.8	737 D	8.8			
27	200	HIRA	43 NS	0340	0430	315 D	130	40		SR
	100	GORK	44 NS	0351 E		432		10		
	180	HIRA	43 NS	0352	0425	300 D	200	50		SR
	200	GORK	43 NS	0400 E		420		30		
	221	ABST	43 NS	0545	0628	80	6			
	202	IZMI	44 NS	0600		360	40			
	260	ONDR	44 NS	0702 E		486 D	71	22		
	127	TORN	44 NS	0720 E	0927.2	500 D	79			V=1
	245	SGMR	44 NS	1039 E	1618	740 D	63.8			3
	410	SGMR	44 NS	1039 E	1334.5	740 D	36.9			3
	200	HIRA	44 NS	2030 E	0030	300 D	40	5		SR
	6100	KISV	1 S	1026.3	1027	2	2			
	2800	OTTA	20 GRF	1420	1426	17 D	1.4			
	2800	OTTA	240 R	1515	1605	50	2	1		
28	2930	VORO	31 ABS	0200	0205	13	12 E			
	260	ONDR	44 NS	0652 E		494 D	47	5		
	245	SGMR	44 NS	1037 E	1230.6	743 D	30.5			2,3
	930	BORD	8 S	1106.4	1106.4	.1	13	1		
	202	IZMI	5 S	1129	1129	.4	144	64		
	930	BORD	8 S	1223	1223.1	.1	19	1		
	930	BORD	46 C	1639	1639.1	.4	72	3		
	2800	OTTA	1 S	1949	1950.2	3	3.2	1.4		
	2695	BCUL	1 S	1950	1951	2	4	1		
29	33	UPIC	45 C	0648.7	0648.7	1.9				
	202	IZMI	41 F	0649	0649	1.5	123			
	29	UPIC	45 C	0649.1	0649.3	.9				
	260	ONDR	8 S	0911.7	0911.7	.2	29			
	245	SGMR	44 NS	1035 E	1709.9	747 D	14			3G
	260	ONDR	2 S/F	1140.7	1141.5	2	6	1.8		
	808	ONDR	3 S	1141.2	1141.7	1	20	7		
	536	ONDR	2 S/F	1141.3	1141.8	2.5	8	2.2		
30	260	ONDR	44 NS	0650 E		497 D	27	3.5		
	245	SGMR	44 NS	1034 E	2010.7	749 D	16.4			
	2800	OTTA	27 RF	1605		59	1	.9		
	2800	OTTA	24 R	1605	1612	7	1			
	2800	OTTA	24P R	1612		43	1			
	2800	OTTA	26 FAL	1655	1704	9	-1	-0.5		
	2800	OTTA	20 GRF	2040	2052	30	.8	.4		
	2695	PENT	240 R	2305	2335	30	3.4	1.7		
31	3100	CRIM	24 R	0944	1135		5			
	245	SGMR	44 NS	1032 E	1318.8	752 D	19.3			
	29	UPIC	42 SER	1201.6	1210.8U	34.6				

SOLAR RADIO EMISSION
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MAR 1978	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
31	33	UPIC	42 SER	1201	1210.5U	35				
	260	ONDR	42 SER	1207	1241.3	72	14			
	2800	OTTA	27 RF	1320		340	2.2	1.5		
	2800	OTTA	24 R	1320	1350	30	2.2	1.1		
	2800	OTTA	24P R	1350		120	2.2			
	2800	OTTA	26 FAL	1550	1900	190	-2.2	-1.1		

Reports received from the following observatories:

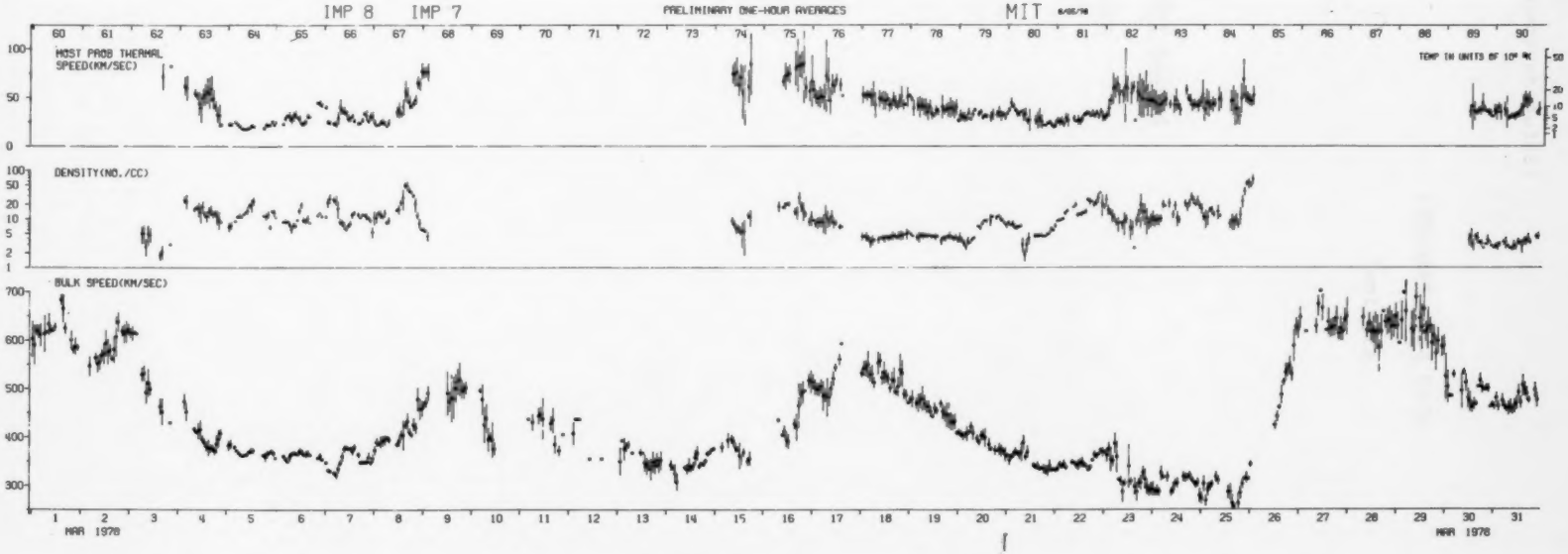
ARCE = Arcetri
BERL = Berlin-Adlershof
BORD = Bordeaux
BOUL = Boulder
CRIM = Simferopol
DWIN = Dwingeloo
GORK = Gorky
HARS = Harestua
HIRA = Hiraiso
HUAN = Huancayo
IRKU = Irkutsk
KIEV = Kiev
MANI = Manila
MCMA = McMath-Hulbert
NAGO = Nagoya
ONDR = Ondrejov
OTTA = Ottawa
PENT = Penticton
POTS = Potsdam
SAOP = Sao Paulo
SGMR = Sagamore Hill
SYDN = Sydney
TORN = Torun
TYKW = Toyokawa
TRST = Trieste
VORO = Voroshilov (Ussurisk)

Explanation of Type Code:

1 Simple 1
2 Simple 1F
3 Simple 2
4 Simple 2F
5 Simple
6 Minor
7 Minor +
8 Spike
20 Simple 3
21 Simple 3A
22 Simple 3F
23 Simple 3AF
24 Rise
25 Rise A
26 Fall
27 Rise and Fall
28 Precursor
29 Post Burst Increase
30 Post Burst Increase A
31 Post Burst Decrease
32 Absorption
40 Fluctuation
41 Group of Bursts
42 Series of Bursts
43 Onset of Noise Storm
44 Noise Storm in Progress
45 Complex
46 Complex F
47 Great Burst
48 Major
49 Major +

IMP 7 AND 8 SOLAR WIND PLASMA

MARCH 1978



SGD 409 Part II (Comprehensive)

FEBRUARY 1978 DATA

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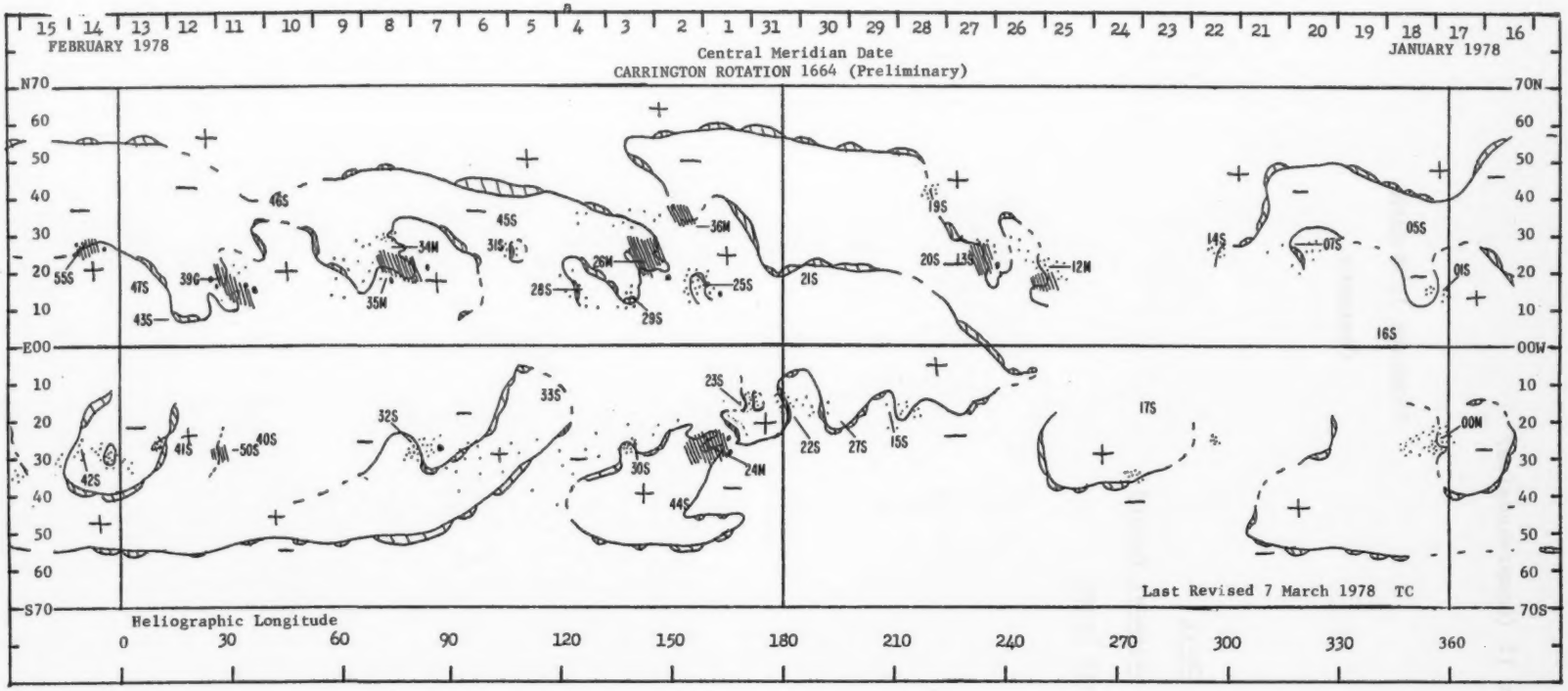
ABBREVIATED CALENDAR RECORD

Hα SYNOPTIC CHART

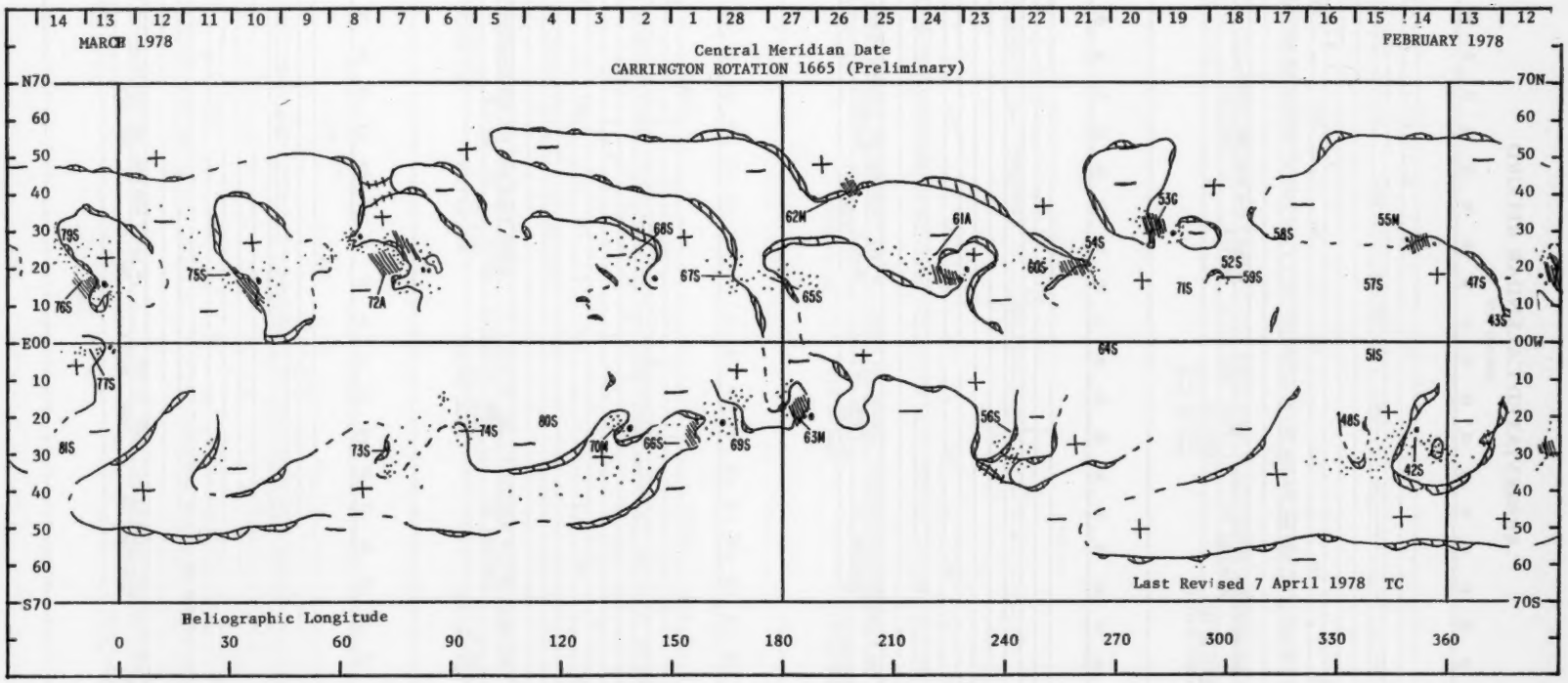
JANUARY - FEBRUARY 1978



ABBREVIATED CALENDAR RECORD

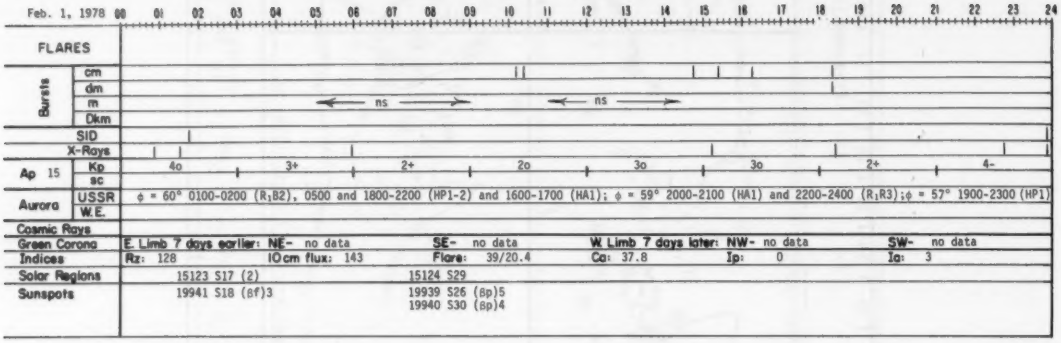
Hα SYNOPTIC CHART

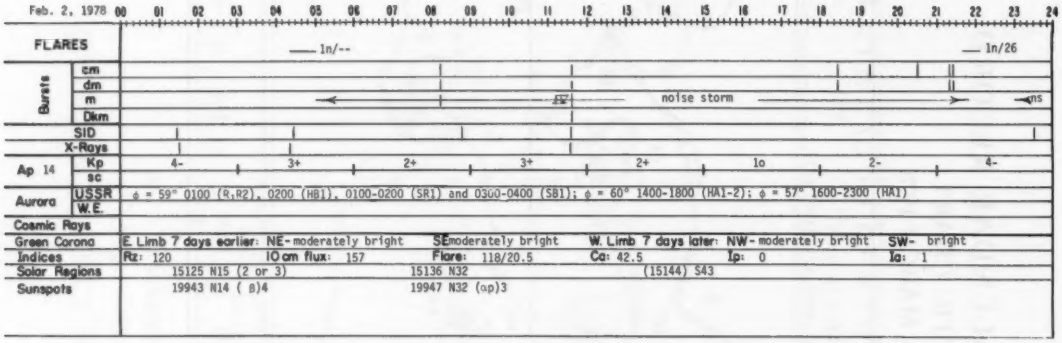
FEBRUARY - MARCH 1978

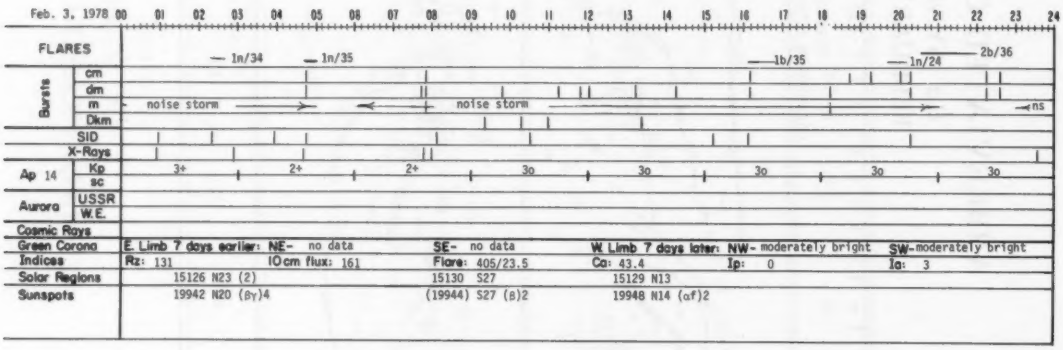


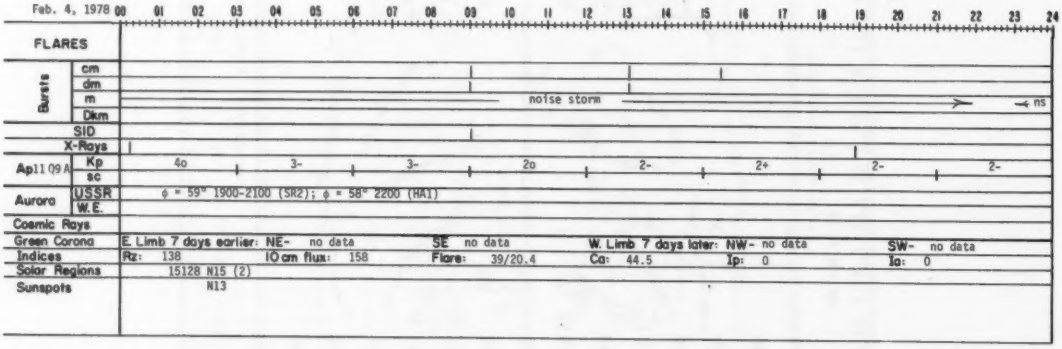
ABBREVIATED CALENDAR RECORD

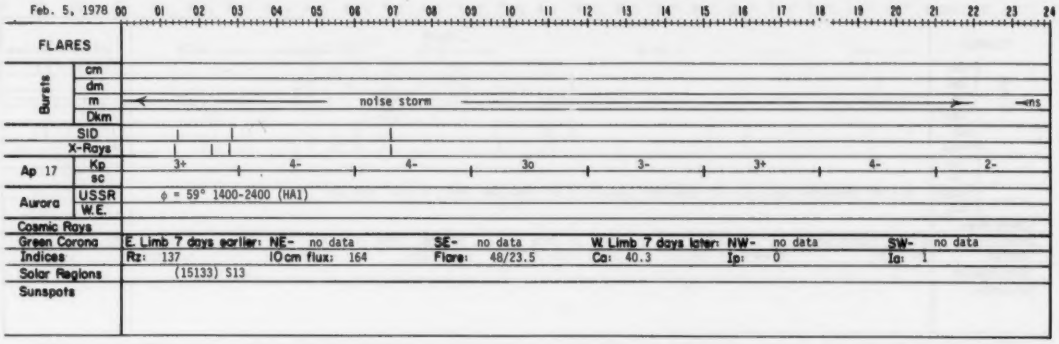
FEBRUARY 1978

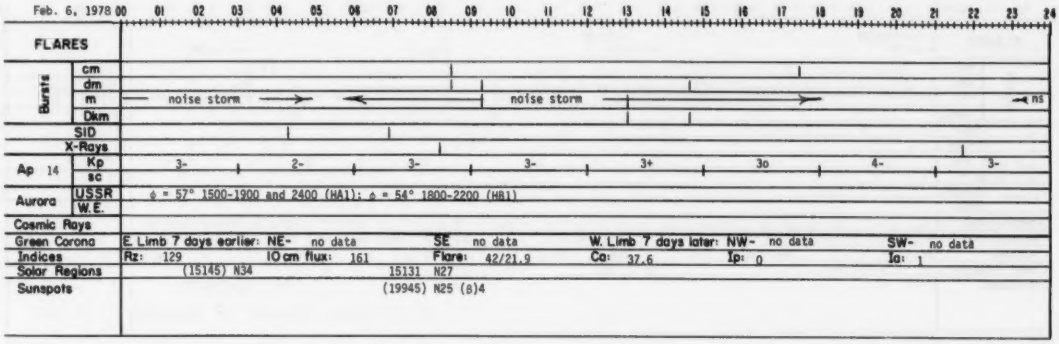


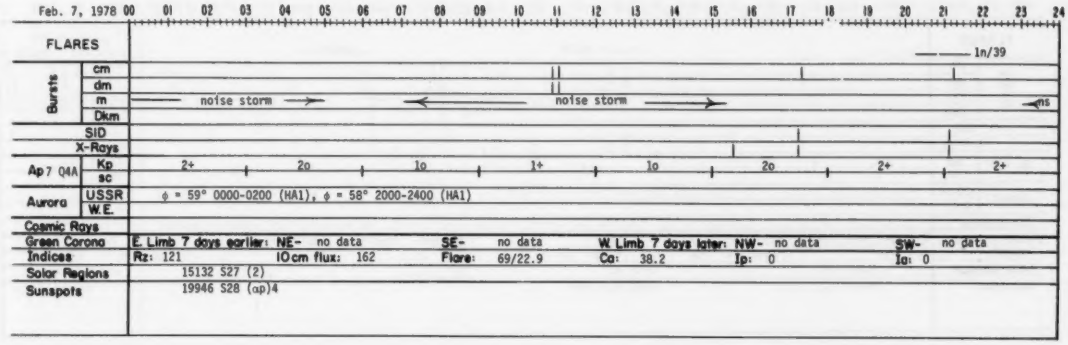


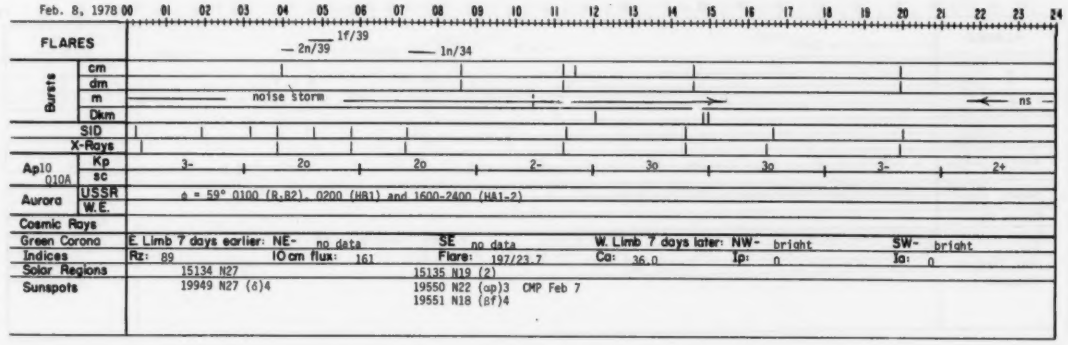


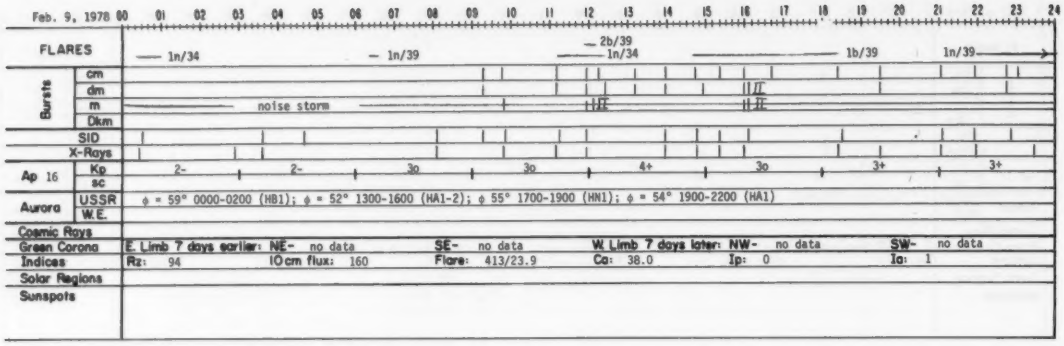


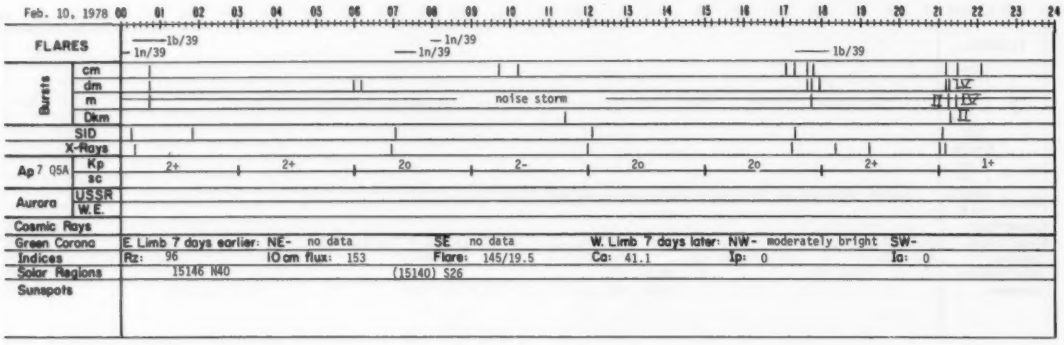

Feb. 5, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
ns
SID
X-Rays
Ap 17
Kp
3+ 4- 4- 3o 3- 3+ 4- 2-
sc
Aurora
USSR
φ = 59° 1400-2400 (HA1)
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 137 10cm flux: 164 Flare: 48/23.5 Ca: 40.3 Ip: 0 Ia: 1
Solar Regions
(15133) S13
Sunspots

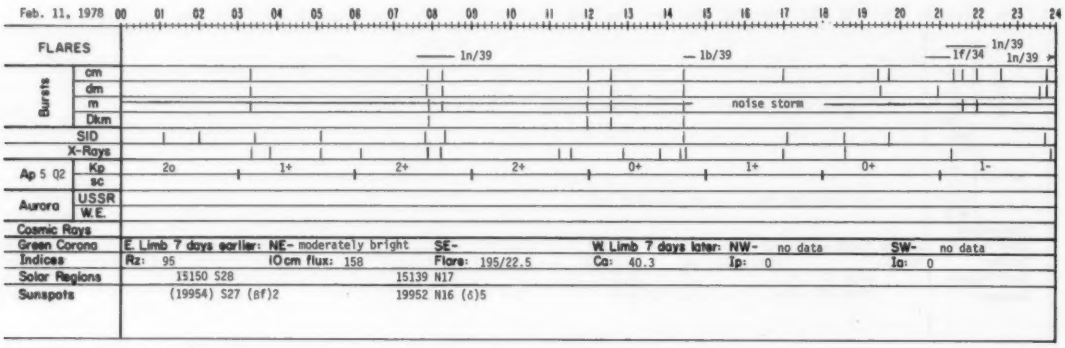

Feb. 6, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
noise storm
ns
SID
X-Rays
Ap 14
Kp
3- 2- 3- 3- 3+ 3o 4- 3-
sc
Aurora
USSR
φ = 57° 1500-1900 and 2400 (HA1); φ = 54° 1800-2200 (HB1)
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 129 10cm flux: 161 Flare: 42/21.9 Ca: 37.6 Ip: 0 Ia: 1
Solar Regions
(15145) N34 15131 N27
Sunspots
(19945) N25 (B)4

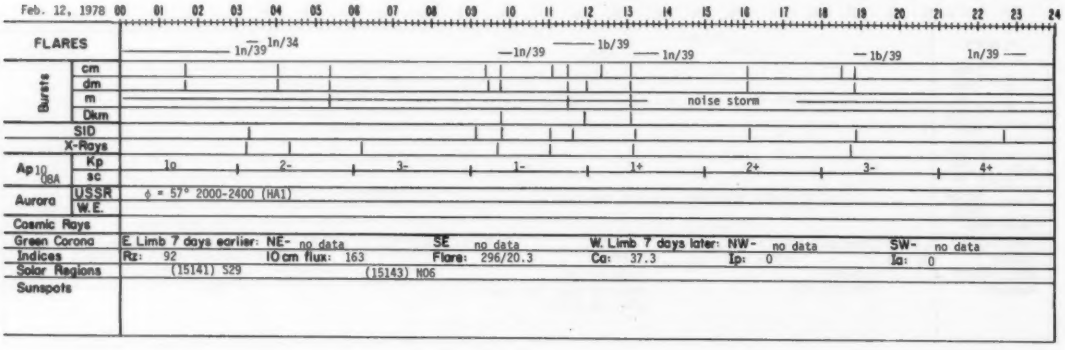

Feb. 7, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
1n/39
Bursts
cm
dm
m
Dkm
noise storm
noise storm
ns
SID
X-Rays
Ap 7 Q4A
Kp
2+ 2o 1o 1+ 1o 2o 2+ 2+
sc
Aurora
USSR
φ = 59° 0000-0200 (HA1), φ = 58° 2000-2400 (HA1)
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 121 10cm flux: 162 Flare: 69/22.9 Ca: 38.2 Ip: 0 Ia: 0
Solar Regions
15132 S27 (2)
Sunspots
19946 S28 (αp)4


Feb. 8, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
1f/39
2n/39
1n/34
Bursts
cm
dm
m
Dkm
noise storm
ns
SID
X-Rays
Ap10
Q10A
Kp
3- 2o 2o 2- 3o 3o 3- 2+
sc
Aurora
USSR
φ = 59° 0100 (R,B2), 0200 (HB1) and 1600-2400 (HA1-2)
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- bright SW- bright
Indices
Rz: 89 10cm flux: 161 Flare: 197/23.7 Ca: 36.0 Ip: n Ia: n
Solar Regions
15134 N27 15135 N19 (2)
Sunspots
19949 N27 (B)4 19550 N22 (αp)3 CMP Feb 7
19551 N18 (βf)4


Feb. 9, 1978
FLARES
1n/34
1n/39
2b/39
1n/34
1b/39
1n/39
Bursts
cm
dm
m
noise storm
Dkm
SID
X-Rays
Ap 16
Kp
2- 2- 3o 3o 4+ 3o 3+ 3+
sc
Aurora
USSR
ϕ = 59° 0000-0200 (HB1); ϕ = 52° 1300-1600 (HA1-2); ϕ 55° 1700-1900 (HN1); ϕ = 54° 1900-2200 (HA1)
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 94 10cm flux: 160 Flare: 413/23.9 Ca: 38.0 Ip: 0 Ia: 1
Solar Regions
Sunspots


Feb. 10, 1978
FLARES
1b/39
1n/39
1n/39
1n/39
1b/39
Bursts
cm
dm
m
noise storm
Dkm
SID
X-Rays
Ap 7 Q5A
Kp
2+ 2+ 2o 2- 2o 2o 2+ 1+
sc
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- moderately bright SW-
Indices
Rz: 96 10cm flux: 153 Flare: 145/19.5 Ca: 41.1 Ip: 0 Ia: 0
Solar Regions
15146 N40 (15140) S26
Sunspots


Feb. 11, 1978
FLARES
1n/39
1b/39
1f/34
1n/39
1n/39
Bursts
cm
dm
m
noise storm
Dkm
SID
X-Rays
Ap 5 Q2
Kp
2o 1+ 2+ 2+ 0+ 1+ 0+ 1-
sc
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE- W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 95 10cm flux: 158 Flare: 195/22.5 Ca: 40.3 Ip: 0 Ia: 0
Solar Regions
15150 S28 15139 N17
Sunspots
(19954) S27 (Bf)2 19952 N16 (δ)5


Feb. 12, 1978
FLARES
1n/39
1n/34
1n/39
1b/39
1n/39
1b/39
1n/39
Bursts
cm
dm
m
noise storm
Dkm
SID
X-Rays
Ap 10 Q8A
Kp
1o 2- 3- 1- 1+ 2+ 3- 4+
sc
Aurora
USSR
ϕ = 57° 2000-2400 (HA1)
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 92 10cm flux: 163 Flare: 296/20.3 Ca: 37.3 Ip: 0 Ia: 0
Solar Regions
(15141) S29 (15143) N06
Sunspots

Feb. 13, 1978 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES: 2n/39 — 1n/39 — 1n/39

Bursts: cm; dm; m; Dkm — noise storm

SID

X-Rays

Ap 8 Q6A — Kp: 3o 3o 2o 2- 1- 2+ 2o 1o; sc

Aurora: USSR; W.E.

Cosmic Rays

Green Corona: E. Limb 7 days earlier: NE- no data; SE- no data; W. Limb 7 days later: NW- moderately bright; SW- moderately bright

Indices: Rz: 93; 10cm flux: 155; Flare: 411/18.1; Ca: no data; Ip: 8; Ia: 6

Solar Regions: (15147) N16

Sunspots

Remarks — Proton Event: Early in the day the 20-40 MeV proton detector on board IMPs 7 and 8 recorded a sharp rise to maximum in the particle flux. The event produced detectable 30 MHz riometer absorption at Thule and along the Alaskan Chain.

Feb. 14, 1978 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES: — 1n/39 — 1n/39 —

Bursts: cm; dm; m — noise storm; Dkm

SID

X-Rays

Ap 11 — Kp: 2+ 1o 1o 3o 3- 2+ 1+ 4+; sc: ▲ 2147(24)

Aurora: USSR: ϕ = 58° 0200-0500 (HA1-2) and 0600 (HP1); ϕ = 49° 2200-2400 (HB1); W.E.

Cosmic Rays: Forbush decrease of about 22% began on the Deep River neutron monitor at end of day, reached a maximum on Feb. 15 near end of day, (see below)

Green Corona: E. Limb 7 days earlier: NE- no data; SE no data; W. Limb 7 days later: NW-; SW- moderately bright

Indices: Rz: 82; 10cm flux: 152; Flare: 89/20.6; Ca: 27.9; Ip: 9; Ia: 9

Solar Regions: (15155) N27; 15142 S27 (2)

Sunspots: (19957) N28 (β)2; 19953 S25 (αp)3

COSMIC RAY: (continued) and returned to normal on Feb. 20.

Remarks — Proton Event: The maximum 30 MHz riometer absorption at Thule exceeded 3 dB.

Feb. 15, 1978 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES: — 1n/39 — 1b/53

Bursts: cm; dm; m — noise storm; Dkm

SID

X-Rays

Ap48 D3 — Kp: 4o 5+ 7- 7+ 4- 2+ 1+ 1o; sc

Aurora: USSR: ϕ = 56° 0100-0500 (R_1V2); ϕ = 59° 1100-1200 (HB2) and 1700 (R_1A2); ϕ = 54° 1300-1400 (R_2R2-3); ϕ = 52° 1500-1600 (HA1); ϕ = 49° 2400 (HB1); W.E.

Cosmic Rays: Forbush decrease that began on Feb. 14 reached a maximum depression of about 22% on the Deep River neutron monitor near end of day.

Green Corona: E. Limb 7 days earlier: NE- no data; SE- no data; W. Limb 7 days later: NW-; SW- moderately bright

Indices: Rz: 59; 10cm flux: 140; Flare: 70/19.4; Ca: 23.4; Ip: 9; Ia: 6

Solar Regions: (15151) S04; (15157) N15

Sunspots

Feb. 16, 1978 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES: — 1n/39 — 1b/39

Bursts: cm; dm; m — noise storm; Dkm

SID

X-Rays

Ap 11 — Kp: 2- 2- 2- 3+ 3o 2o 3o 3+; sc

Aurora: USSR: ϕ = 58° 0500 (R_1B2) and 0600 (HA1); ϕ = 50° 1300 (HA2); ϕ = 59° 1500-1600 and 1900-2200 (HB1); ϕ = 52° 2100 (HP1); W.E.

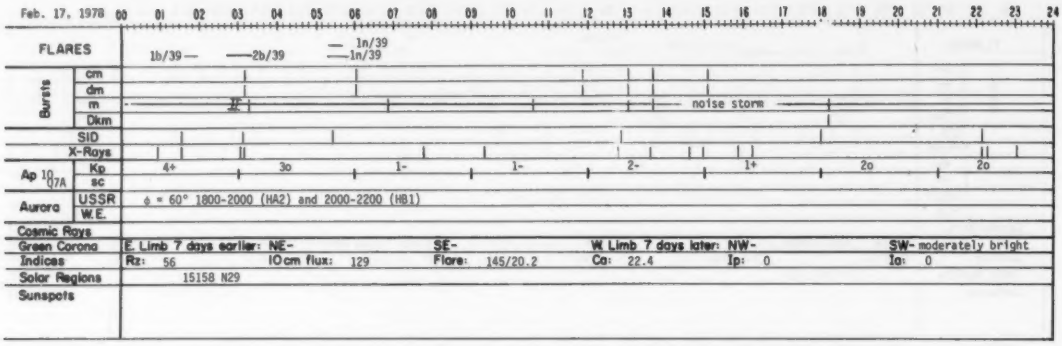
Cosmic Rays

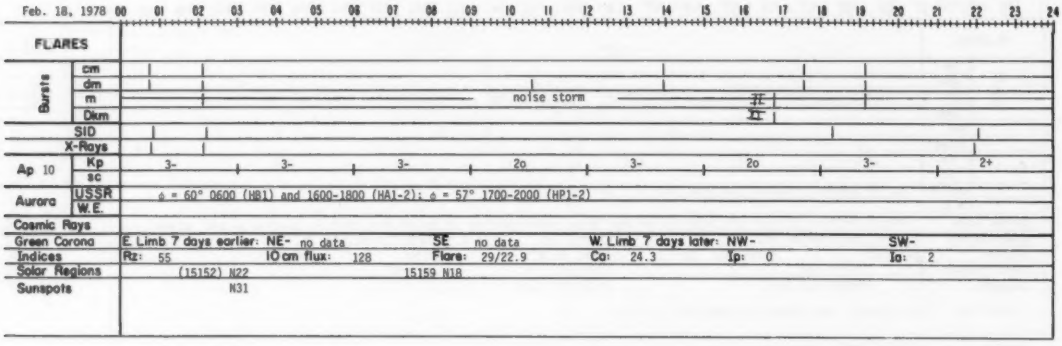
Green Corona: E. Limb 7 days earlier: NE-; SE; W. Limb 7 days later: NW- no data; SW- no data

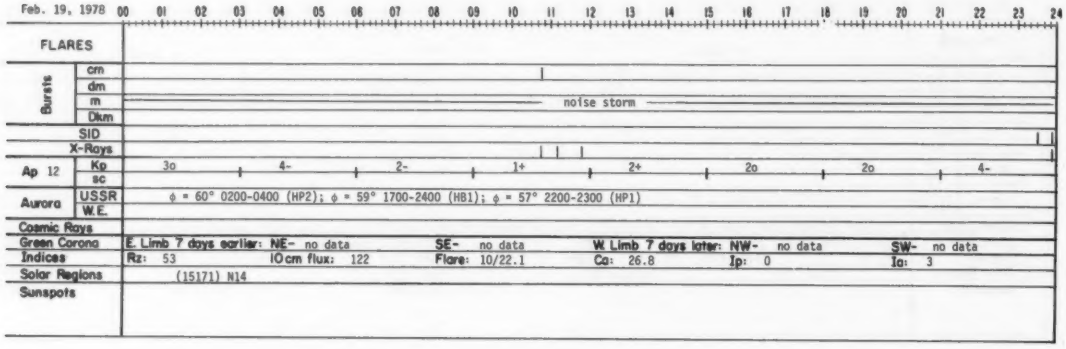
Indices: Rz: 64; 10cm flux: 133; Flare: 97/14.9; Ca: 22.2; Ip: 5; Ia: 0

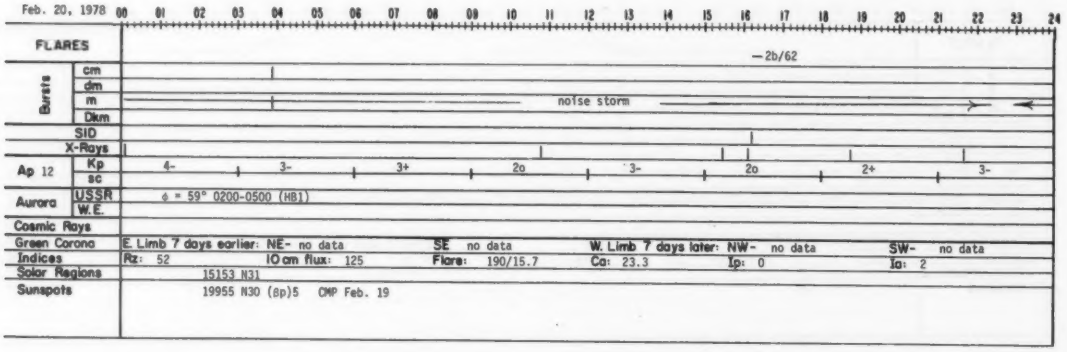
Solar Regions: 15148 S22

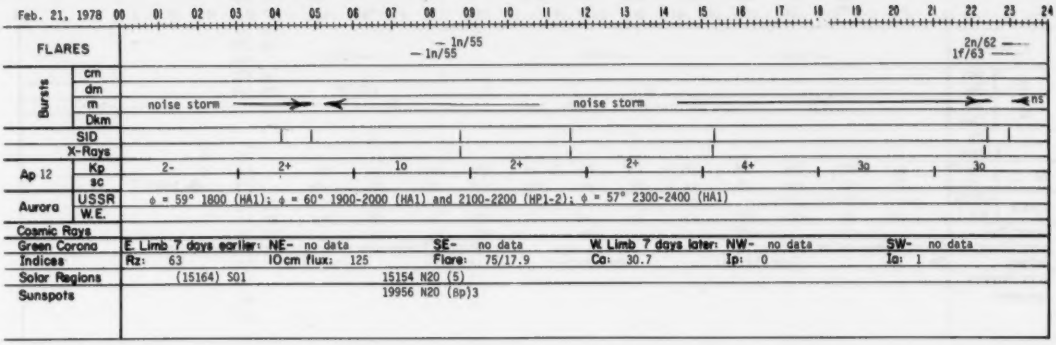
Sunspots: S27

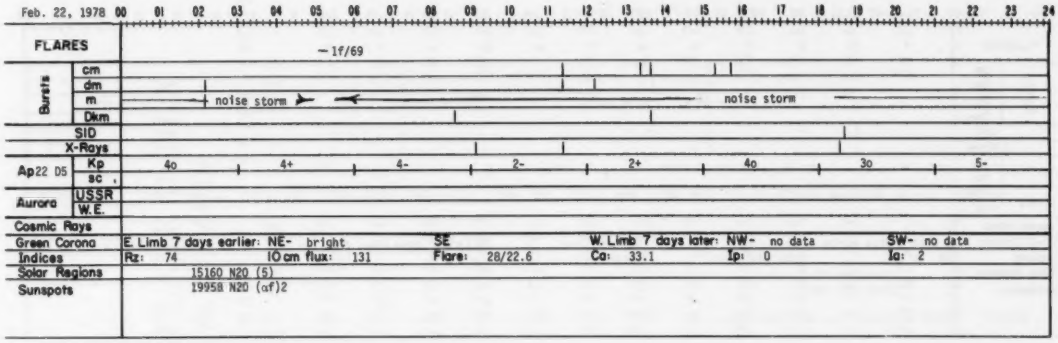

Feb. 17, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
1b/39
2b/39
1n/39
1n/39
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 10
Kp
sc
4+
3o
1-
1-
2-
1+
2o
2o
07A
Aurora
USSR
W.E.
ϕ = 60° 1800-2000 (HA2) and 2000-2200 (HB1)
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE-
SE-
W. Limb 7 days later: NW-
SW- moderately bright
Indices
Rz: 56
10cm flux: 129
Flare: 145/20.2
Ca: 22.4
Ip: 0
Ia: 0
Solar Regions
15158 N29
Sunspots

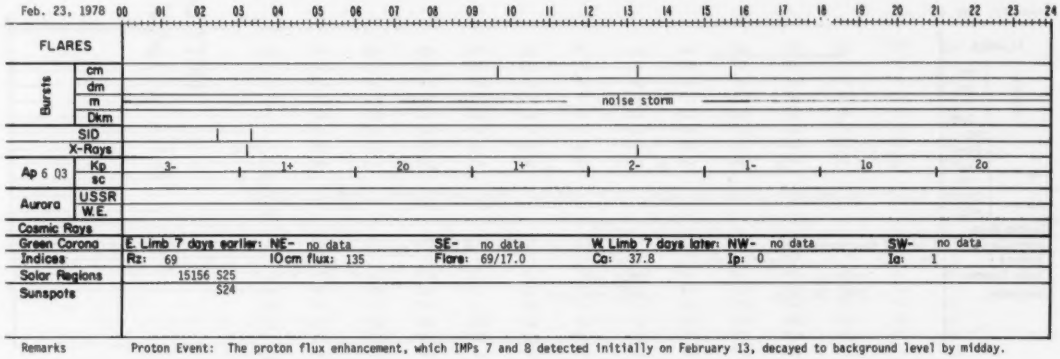

Feb. 18, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 10
Kp
sc
3-
3-
3-
2o
3-
2o
3-
2+
Aurora
USSR
W.E.
ϕ = 60° 0600 (HB1) and 1600-1800 (HA1-2); ϕ = 57° 1700-2000 (HP1-2)
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data
SE no data
W. Limb 7 days later: NW-
SW-
Indices
Rz: 55
10cm flux: 128
Flare: 29/22.9
Ca: 24.3
Ip: 0
Ia: 2
Solar Regions
(15152) N22
15159 N18
N31
Sunspots


Feb. 19, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 12
Kp
sc
3o
4-
2-
1+
2+
2o
2o
4-
Aurora
USSR
W.E.
ϕ = 60° 0200-0400 (HP2); ϕ = 59° 1700-2400 (HB1); ϕ = 57° 2200-2300 (HP1)
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data
SE- no data
W. Limb 7 days later: NW- no data
SW- no data
Indices
Rz: 53
10cm flux: 122
Flare: 10/22.1
Ca: 26.8
Ip: 0
Ia: 3
Solar Regions
(15171) N14
Sunspots

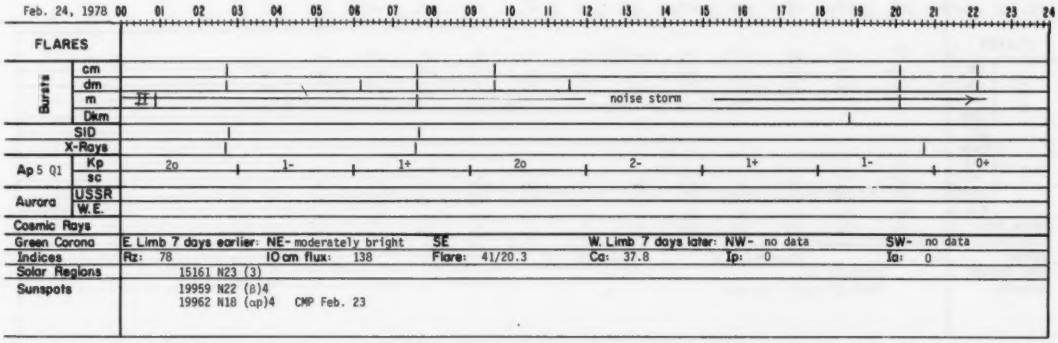

Feb. 20, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
2b/62
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 12
Kp
sc
4-
3-
3+
2o
3-
2o
2+
3-
Aurora
USSR
W.E.
ϕ = 59° 0200-0500 (HB1)
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data
SE no data
W. Limb 7 days later: NW- no data
SW- no data
Indices
Rz: 52
10cm flux: 125
Flare: 190/15.7
Ca: 23.3
Ip: 0
Ia: 2
Solar Regions
15153 N31
Sunspots
19955 N30 (βp)5 CMP Feb. 19

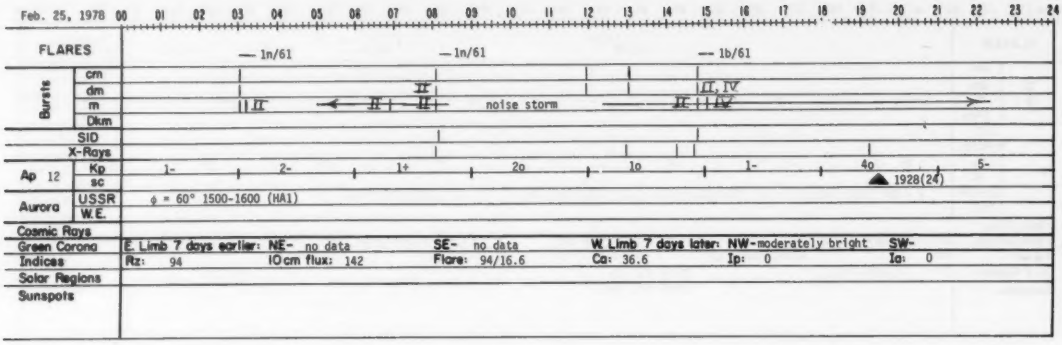


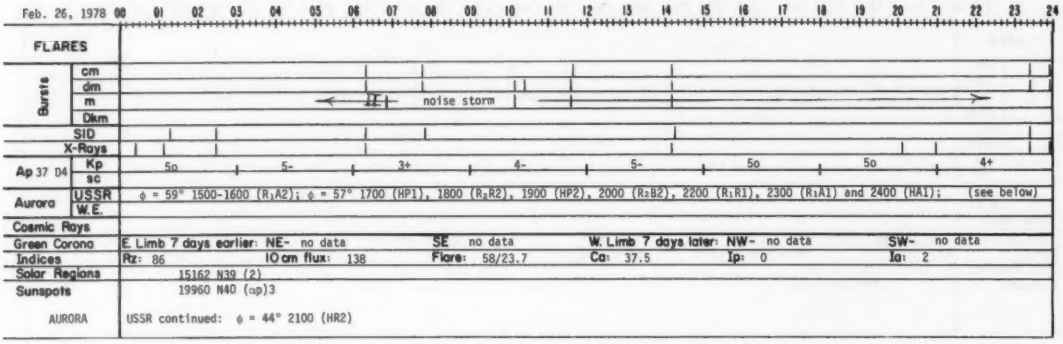


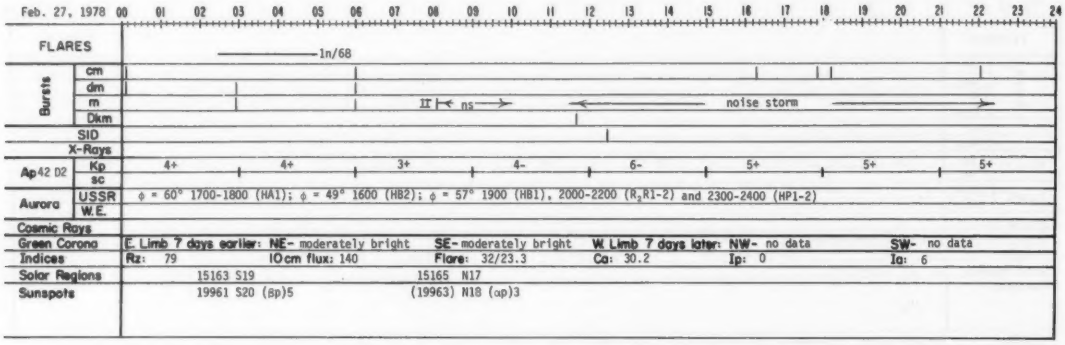


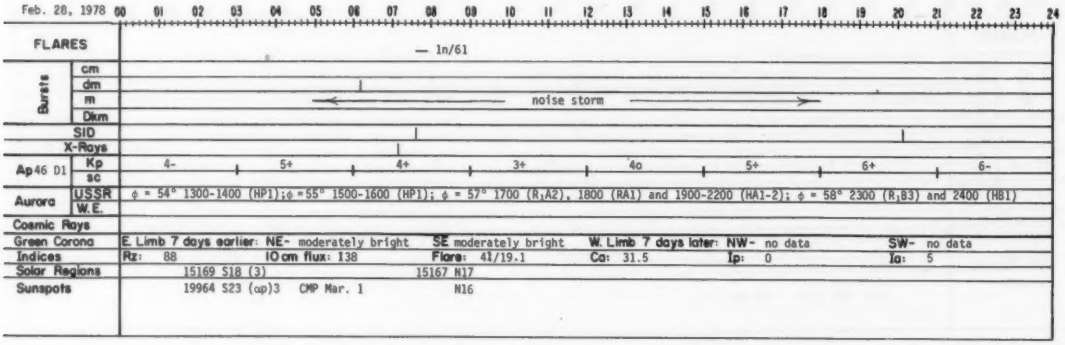
Remarks Proton Event: The proton flux enhancement, which IMPs 7 and 8 detected initially on February 13, decayed to background level by midday.




Feb. 25, 1978
FLARES
1n/61
1n/61
1b/61
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 12
Kp
sc
1- 2- 1+ 2o 1o 1- 4o 5-
1928(24)
Aurora
USSR
W.E.
φ = 60° 1500-1600 (HA1)
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- moderately bright SW-
Indices
Rz: 94 10cm flux: 142 Flare: 94/16.6 Ca: 36.6 Ip: 0 Ia: 0
Solar Regions
Sunspots


Feb. 26, 1978
FLARES
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 37 D4
Kp
sc
5o 5- 3+ 4- 5- 5o 5o 4+
Aurora
USSR
W.E.
φ = 59° 1500-1600 (R1A2); φ = 57° 1700 (HP1), 1800 (R2R2), 1900 (HP2), 2000 (R2B2), 2200 (R1R1), 2300 (R1A1) and 2400 (HA1); (see below)
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 86 10cm flux: 138 Flare: 58/23.7 Ca: 37.5 Ip: 0 Ia: 2
Solar Regions
15162 N39 (2)
Sunspots
19960 N40 (αp)3
AURORA
USSR continued: φ = 44° 2100 (HR2)


Feb. 27, 1978
FLARES
1n/68
Bursts
cm
dm
m
Dkm
ns
noise storm
SID
X-Rays
Ap 42 D2
Kp
sc
4+ 4+ 3+ 4- 6- 5+ 5+ 5+
Aurora
USSR
W.E.
φ = 60° 1700-1800 (HA1); φ = 49° 1600 (HB2); φ = 57° 1900 (HB1), 2000-2200 (R2R1-2) and 2300-2400 (HP1-2)
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE- moderately bright W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 79 10cm flux: 140 Flare: 32/23.3 Ca: 30.2 Ip: 0 Ia: 6
Solar Regions
15163 S19 15165 N17
Sunspots
19961 S20 (βp)5 (19963) N18 (αp)3


Feb. 28, 1978
FLARES
1n/61
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 46 D1
Kp
sc
4- 5+ 4+ 3+ 4o 5+ 6+ 6-
Aurora
USSR
W.E.
φ = 54° 1300-1400 (HP1); φ = 55° 1500-1600 (HP1); φ = 57° 1700 (R1A2), 1800 (RA1) and 1900-2200 (HA1-2); φ = 58° 2300 (R1B3) and 2400 (HB1)
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE moderately bright W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 88 10cm flux: 138 Flare: 41/19.1 Ca: 31.5 Ip: 0 Ia: 5
Solar Regions
15169 S18 (3) 15167 N17
Sunspots
19964 S23 (αp)3 CMP Mar. 1 N16

REGIONAL FLARE INDEX

INCLUDES ALL FLARES

MC MATH PLAGE NO.	LAT	CMP DATE	DATE FIRST FLARE	DATE LAST FLARE	FLARE-INDEX SUM	FLARE-INDEX MEAN	TOTAL NO. OF FLARES
15123	S17	78/02/01.2	78/01/27	78/02/07	20.68	1.72	9
15124	S29	78/02/01.9	78/01/25	78/02/06	258.77	19.91	73
15125	N16	78/02/02.0	78/01/28	78/02/08	20.00	1.67	9
15136	N33	78/02/02.2	78/02/03	78/02/07	295.17	59.03	13
15144	S43	78/02/02.5	78/02/06	78/02/06	.87	.87	1
15126	N24	78/02/03.1	78/01/27	78/02/08	145.30	11.18	40
15131	N27	78/02/06.1	78/02/01	78/02/01	1.82	1.82	2
15132	S27	78/02/07.8	78/02/01	78/02/09	13.73	1.53	5
15134	N27	78/02/08.3	78/02/02	78/02/14	494.36	38.03	51
15135	N20	78/02/08.4	78/02/01	78/02/15	140.69	9.38	53
15139	N17	78/02/11.8	78/02/05	78/02/18	1456.46	104.03	198
15142	S28	78/02/15.4	78/02/09	78/02/17	31.82	3.54	11
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